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# **Assistance at mealtimes in hospital settings and rehabilitation units for older adults (>65 years) from the perspective of patients, families and healthcare professionals: a mixed methods systematic review**

## **Reviewers**

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## **Executive summary**

### **Background**

The prevalence of malnutrition for older adults (>65 years) in hospital and rehabilitation units has been reported as being as high as 60%, some older patients with good appetites do not receive sufficient nourishment because of inadequate feeding assistance. Mealtime assistance can enhance nutritional intake, clinical outcomes and patient experience.

### **Objectives**

A mixed methods review sought to develop an aggregated synthesis of quantitative and qualitative data on assistance at mealtimes for older adults (>65 years) in hospital settings and rehabilitation units in order to determine what goes on, what works and what do patients, families and healthcare professionals think about it?

### **Inclusion criteria**

The review included:

#### ***Types of participants***

Older adults (65 years and over), in hospital settings including rehabilitation units.

#### ***Types of intervention(s)/phenomena of interest***

Studies that included interventions for mealtime assistance, observed mealtime assistance or discussed experiences of mealtime assistance with patients, families and healthcare professionals.

#### ***Types of studies***

Qualitative, quantitative and mixed methods studies.

#### ***Types of outcomes***

The outcomes of interest were the effectiveness of mealtime assistance initiatives and experiences of assistance at mealtimes.

### **Search strategy**

The search strategy identified studies from seven databases published between 1998-2015.

### **Methodological quality**

Methodological quality of studies was independently assessed by two reviewers using standardized Joanna Briggs Institute critical appraisal instruments.

### **Data extraction**

Standardized Joanna Briggs Institute data extraction tools were used.

### **Data synthesis**

Synthesis of the findings was reached through discussion. The results of quantitative studies could not be statistically pooled due to heterogeneity and were presented in narrative form. The results are presented as three aggregated mixed methods syntheses.

### **Results**

Twenty-one publications (nineteen studies) were included: eleven quantitative, five qualitative and three mixed method studies. Two studies were conducted in rehabilitation units, seventeen in hospital wards. Eight qualitative studies (nine papers) considered experience of extrinsic and intrinsic factors that influence mealtime support. Evidence for the effectiveness of interventions was limited to eight studies (nine papers); the remaining quantitative studies included two cross sectional studies, three descriptive evaluations (four papers) and one observational/case study. The three aggregated mixed methods syntheses were:

1. Mealtimes should be viewed as high priority, healthcare staff should limit other activities during mealtimes and allow older patients to eat uninterrupted, providing support where required.
- 2a. Nursing staff, employed mealtime assistants, volunteers, or relatives/visitors can help prepare the older patient for meals; this includes opening packages and cutting up food as well as physically feeding patients.
- 2b. Social interaction at mealtimes for older patients is effective in increasing food intake, energy and protein intake and should be encouraged.
3. Communication between all members of the multi-disciplinary team, staff and volunteers is essential.

### **Conclusions**

No firm conclusions can be drawn in respect to the most effective initiatives. Initiatives with merit include those that encourage social interaction, either through the use of a dining room, or employed staff or volunteers, relatives or visitors supporting the older patient during mealtimes. Volunteers value training and support and clarification of their roles and responsibilities.

### **Implications for practice**

Staff should use protected mealtimes to provide support to patients and limit other ward based activities (Grade A). Patients should be given adequate time to eat and asked if they require assistance (Grade A). Nutritional needs should be identified on individual care plans which should be accessible to staff and volunteers (Grade B). Adequate training and support should be provided for volunteers and employed assistants (Grade B). Social interaction should be encouraged at mealtimes (Grade B).

### **Implications for research**

Further high quality research is required to determine the effectiveness of the 'red tray' system, protected mealtimes, relative and volunteer support at mealtimes, employed assistants and providing mealtimes in a dining room. Future research should investigate views of the older adults themselves.

### **Keywords**

Mealtime assistance, feeding assistance, mealtimes, hospitals, older adults, elderly, volunteers, protected mealtimes, supervised dining rooms, red trays, facilitators, barriers, rehabilitation units, carers, family members, nutritional status, nutritional intake

## Background

The mixed methods review investigates the feasibility, acceptability and effectiveness of initiatives for improving assistance at mealtimes for older adults (>65 years) in the context of care provided in hospital settings and rehabilitation units. The comparison was usual care. Outcomes considered were nutritional intake and nutritional status and the perceptions and experiences of older adult patients and those involved with their care with regard to assistance at mealtimes. The area of interest was what goes on, what works and what do patients, families and healthcare professionals think about it in relation to mealtime support provided in hospital settings and rehabilitation units? Healthcare professionals and volunteers were defined as any healthcare professional or volunteer involved in providing mealtime support to older adults (>65 years) in hospital settings and rehabilitation units. The views of family members regarding the provision of mealtime support to their elderly relatives (>65 years) in these settings were also included.

Worldwide, it is estimated that between 20% and 50% of all adult patients admitted to hospital wards are malnourished.<sup>1</sup> Reported prevalence occurs depending on the specific patient group of interest, type of healthcare setting, disease state and criteria used to assess malnutrition.<sup>2</sup> For older adults (>65 years) in hospital, the prevalence of malnutrition has been reported as being as high as 60%<sup>3</sup> and can continue to deteriorate during the hospital stay.<sup>4</sup> This is an area of concern as it is associated with prolonged hospital stays and increased morbidity (pressure ulcers, infections and falls) and mortality, especially for those with chronic conditions.<sup>2</sup>

Malnutrition in adults in developed countries is frequently associated with disease and may occur because of reduced dietary intake, malabsorption, increased nutrient losses or altered metabolic demands with reduced dietary intake being considered the single most important aetiological factor.<sup>5</sup> For the hospitalized older adult patient with pre-existing malnutrition, further nutritional problems are often encountered due to a reduced dietary intake. Poor food intake for older patients in hospital may be due to the effects of acute illness, poor appetite, nausea or vomiting, “nil by mouth” orders, medication side effects, catering limitations, swallowing and/or oral problems, difficulty with vision and opening containers, the placement of food out of the patients' reach, limited access to snacks, and cultural or religious food preferences.<sup>6</sup>

In the UK, national reports have shown some older patients with good appetites were not receiving sufficient nourishment because of inadequate feeding assistance.<sup>7-9</sup> An initial search of the literature found that this problem has also been identified in Australia,<sup>10,11</sup> New Zealand,<sup>12</sup> Sweden,<sup>13</sup> and the USA.<sup>14,15</sup>

A variety of initiatives have been developed to try to ensure that patients receive mealtime assistance if required, and include for example:

- Providing meals on red trays for “at risk” patients<sup>16</sup> – this acts as a signal to staff that those patients eating from a red tray should receive support in eating their food.
- Protected mealtimes<sup>17</sup> – where patients are able to eat undisturbed at mealtimes and do not have any unnecessary or avoidable interruptions during this time and nursing staff are available to assist with feeding.
- Supervised dining rooms<sup>18</sup> – where social interaction and verbal encouragement is provided
- Employment of personnel at mealtimes to assist with mealtime activities<sup>19,20</sup> (family members, paid employers or volunteers).

Four reviews<sup>21-24</sup> and one scoping review<sup>26</sup> were identified from a detailed search of the existing evidence base. All of the reviews included adult patients over 18 years of age. The focus of the systematic review by Green et al.<sup>21</sup> was volunteers providing feeding assistance in any institutional setting; it included a narrative analysis of 10 empirical studies from a limited number of database searches. There was some evidence that volunteers can improve mealtime care of adult patients or residents in institutional settings, however only a few well designed studies were reported. Weekes et al.<sup>23</sup> conducted a structured literature review focusing upon improving nutritional care for patients in any healthcare setting, with specific emphasis on feeding assistance and the dining environment. The review was limited to quantitative study designs (randomized controlled trials, controlled trials and observational studies) and audits. Findings from two well conducted trials in the use of employed feeding assistance for hospitalised patients were inconclusive, whereas the small observational studies would suggest that good quality feeding assistance was associated with increased food intake

and decreased weight loss for patients in a specialised dementia unit and for dysphagia patients in a nursing home environment. A systematic review by Wade et al.<sup>24</sup> investigated nutritional models of care (feeding assistance, protected mealtimes, red tray initiative and communal dining) for hospitalized and rehabilitation inpatients. This review focused on data from trials only and only three databases were searched. The findings from poor quality studies showed that volunteer feeding assistance and extra nutritional support provided by healthcare assistants and dietetic assistants improve energy and protein intake in hospitalised patients. There was limited evidence retrieved for communal dining and protected mealtimes and no evidence for red tray initiatives. A Joanna Briggs Institute (JBI) systematic review<sup>22</sup> has also been published on the topic of mealtime assistance. A comprehensive search strategy was outlined and the review included six randomized controlled trials and quasi experimental designs covering a range of outcomes, but was limited to inpatients in acute care hospitals. The results showed that energy intake can be increased in patients when either employed assistants or trained volunteers are present to provide mealtime support or when patients eat in a supervised dining room. It was also demonstrated that protein intake can be increased when volunteers were present to provide mealtime support. A scoping review by Cheung et al.<sup>26</sup> included intervention studies only, published from 2001 to 2012 from across three databases. The focus was on the evidence for dietary, foodservice and mealtime interventions in the acute care setting. No comprehensive mixed methods review was identified that investigated both the effectiveness of the varying types of mealtime assistance provided in hospital and rehabilitation settings and the views of patients, health care professionals, family member and volunteers on mealtime assistance. In summary these reviews have demonstrated that mealtime assistance has the potential to enhance nutritional intake, clinical outcomes,<sup>21-24</sup> and patient experience.<sup>21,25</sup>

The review investigates the feasibility, acceptability and effectiveness of initiatives for improving assistance at mealtimes for older adults (>65 years) in hospital settings and rehabilitation units and asks the questions what goes on, what works and what do patients, families and healthcare professionals think about it? In this mixed methods review the quantitative component incorporates a wider range of study designs, including but not limited to, cohort studies (with control), case-controlled studies, descriptive and case series designs. A qualitative component is incorporated to help us understand why initiatives do or do not work. Combining both quantitative and qualitative studies in the same review, makes this the first mixed methods systematic review which considers assistance at mealtimes for older adults over 65 years of age in both hospital settings and rehabilitation units. For the purposes of this review mealtime assistance is defined as receiving help from another person to eat or to complete the eating process when a meal or snack is served.<sup>27</sup> This includes for example; making sure that suitable cutlery is available; taking lids of food products; cutting food into smaller pieces; providing verbal encouragement; or physically feeding a patient by transferring food from the plate to the person's mouth, either at the bedside or in a separate dining room. The comparison was usual care. Outcomes considered were nutritional intake and nutritional status and the perceptions and experiences of older adult patients and those involved with their care with regard to assistance at mealtimes.. Healthcare professionals and volunteers were defined as any healthcare professional or volunteer involved in providing mealtime support to older adults (>65 years) in hospital settings and rehabilitation units, The views of family members regarding the provision of mealtime support to their elderly relatives (>65 years) in these settings were also included.

## Review question/objectives

The review question was: Assistance at mealtimes for older adults (>65 years) in hospital settings and rehabilitation units: what goes on, what works and what do patients, families and healthcare professionals think about it?

The specific objectives were:

- To determine the effectiveness of mealtime assistance initiatives for improving nutritional intake and nutritional status for older adult patients in hospital settings and rehabilitation units
- To identify and explore the perceptions and experiences of older adult patients and those involved with their care with regard to assistance at mealtimes in hospital settings and rehabilitation units

This mixed methods review sought to develop an aggregated synthesis of quantitative and qualitative data on assistance at mealtimes for older adults (>65 years) in hospital settings and rehabilitation units, to attempt to derive conclusions and recommendations useful for clinical practice and policy decision making.

## Inclusion criteria

### Types of participants

For the first objective studies that included older adults (65 years and over) from any ethnic background in hospital settings including rehabilitation units, with any diagnosis were considered.

For the second objective studies that included older adults (65 years and over) from any ethnic background in hospital settings including rehabilitation units, with any diagnosis were considered. In addition studies including or focusing on the following peoples perspectives were also included:

- (a) family members (those who come and visit their elderly relative)
- (b) volunteers (additional personnel who are members of the public that come in and volunteer at mealtimes to assist with mealtime activities)
- (c) healthcare professionals (those additionally employed at mealtimes to assist with mealtime activities or those undertaking this duty as part of their usual role)

More specifically, to be included, studies needed to focus on older adults (65 years and older) by

- (a) focusing exclusively on adults aged 65 years and over *or*
- (b) focusing on a wider age group but including sufficient detail to enable the accurate identification of data relating to adults aged over 65 years specifically *or*
- (c) relating to a study sample where the mean age was over 65 years

### *Exclusion criteria:*

- Patients under 65 years of age;
- Artificial feeding such as patients obtaining their nutrition exclusively by enteral or parenteral means;
- Patients residing in other healthcare settings such as nursing homes or long term care facilities.

### Types of intervention(s)

For the quantitative component of this review, interventions included but were not limited to:

Mealtime assistance practices (healthcare professionals, volunteers, family/carers,) for example:  
Mealtime assistance initiatives where patients are provided with feeding assistance by health care professional staff, volunteers or family members or carers.

Organizational practices for example:

Protected mealtimes – where patients are able to eat undisturbed at mealtimes and do not have any unnecessary or avoidable interruptions during this time and nursing staff are available to assist with feeding.

Supervised dining rooms – where social interaction and verbal encouragement is provided.

Food service practices for example:

Providing meals on coloured trays for “at risk” patients – this acts as a signal to staff that those patients eating from a red tray should receive support in eating their food.

Other initiatives that aim to improve assistance at mealtimes in hospital settings including rehabilitation units as determined by the literature in the area were incorporated, as necessary. However, intervention strategies that focused on promoting the identification of malnutrition e.g. nutritional screening were not included in this review.

### **Phenomena of interest**

The qualitative component of this review considered studies that identified and explored the perceptions and experiences of older adults (>65 years) in hospital settings including rehabilitation units and those involved with their care with regard to assistance at mealtimes.

### **Types of outcomes**

For the first objective in order to determine the effectiveness of mealtime assistance initiatives, the primary outcomes of interest were measures of improved nutritional intake and/or nutritional status. For nutritional intake these included energy intake, protein intake as assessed by actual or subjective measures of plate intake or documented food intake. For nutritional status these included anthropometric measures of patient weight (for example body mass index, mid-arm circumference, mid-arm muscle circumference, hand grip dynamometry and triceps skinfold thickness) and biochemical markers (for example serum albumin). Secondary outcome measures were length of stay, post-operative complications, and all-cause mortality.

For the second objective studies were considered that identified or described assistance at mealtimes from the perspective of the patient, health care professional, carer or family members. It was anticipated that descriptive surveys using questionnaires would be the methods employed in the majority of studies.

### **Context**

The context of the review was hospital settings and rehabilitation units, all geographical settings were included.

### **Types of studies**

To address the first objective, the quantitative component considered all experimental quantitative study designs including but not limited to randomised controlled trials, non-randomized controlled trials, clinical trials, , quasi-experimental studies.

To address the second objective both quantitative and qualitative data were considered. The quantitative component considered all non-experimental study designs including but not limited to observational studies and descriptive studies. The qualitative component of the review considered studies that focused on qualitative data including, but not limited to, designs such as phenomenology, grounded theory and ethnography, action research and feminist research.

### **Search strategy**

The search strategy located published studies from 1998 to 2015. The initial search of the literature and studies retrieved from the previous reviews in this subject area did not find any relevant literature prior to 1998, hence the decision to limit the start date to 1998. Only English language papers were included within this review due to the limited resources available. The search strategy from some of the major databases are included in Appendix I. A three-step search strategy was utilized for each component of this review. An initial limited search of MEDLINE and CINAHL was undertaken followed

by an analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. Preliminary keywords included 'hospital\*', *with* 'adult\*', 'patient\*' *with* 'meal\*' *with* 'assist\*', 'help\*', 'support\*', 'food assistance' and 'feed\*.

A second search using all identified keywords and index terms was then undertaken across all included databases. Thirdly, the reference list of all identified reports and articles were searched for additional studies.

The databases searched for published material included:

- CINAHL
- MEDLINE
- British Nursing Index
- Cochrane Central Register of Controlled Trials
- EMBASE
- PsycINFO
- Web Of Science

### **Assessment of methodological quality**

Quantitative papers were assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Meta Analysis of Statistics Assessment and Review Instrument (JBI-MASARI) (Appendix II). Any disagreements that arose between the reviewers were resolved through discussion, or with a third reviewer.

Qualitative papers were assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Qualitative Assessment and Review Instrument (JBI-QARI) (Appendix III). Any disagreements that arose between the reviewers were resolved through discussion, or with a third reviewer.

When a study met a criterion for inclusion (for example; 10 items for RCTs, 7 items for comparable cohort /case control studies, 7 for descriptive/case series studies and 10 for qualitative studies) a score of 1 was given. Where a particular point for inclusion was regarded as "unclear" it was given a score of 0. Where a particular point for inclusion was regarded as "not applicable" this point was taken off the total score. All included studies were assessed using this method and their overall critical appraisal scores were presented. Studies were only excluded if they scored 0 using this approach. Studies that scored below 4 were still included given their relevance to the area of inquiry and the overall limited number of retrieved records included in the synthesis..

### **Data extraction**

Two reviewers independently carried out data extraction from the included studies. Quantitative data was extracted from papers included in the review using the standardized data extraction tool from JBI-MASARI (Appendix IV). The data extracted included specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives. Qualitative data was extracted from papers included in the review using the standardized data extraction tool from JBI-QARI (Appendix V). The data extracted included specific details about the phenomenon of interest, populations, study methods and outcomes of significance to the review question and specific objectives. As there was agreement on data extracted, the third reviewer was not required.

Authors of both quantitative and qualitative primary studies were contacted for missing information or to clarify unclear data. Only one author<sup>41</sup> responded but no additional data was obtained.

### **Data synthesis**

As the experimental studies included in this review used a range of different types of interventions to address a variety of outcomes, it was not possible to pool the results using the statistical meta-



analysis process embedded in JBI-MAStARI. Quantitative findings from the experimental and descriptive observational studies have therefore been presented in a narrative form.

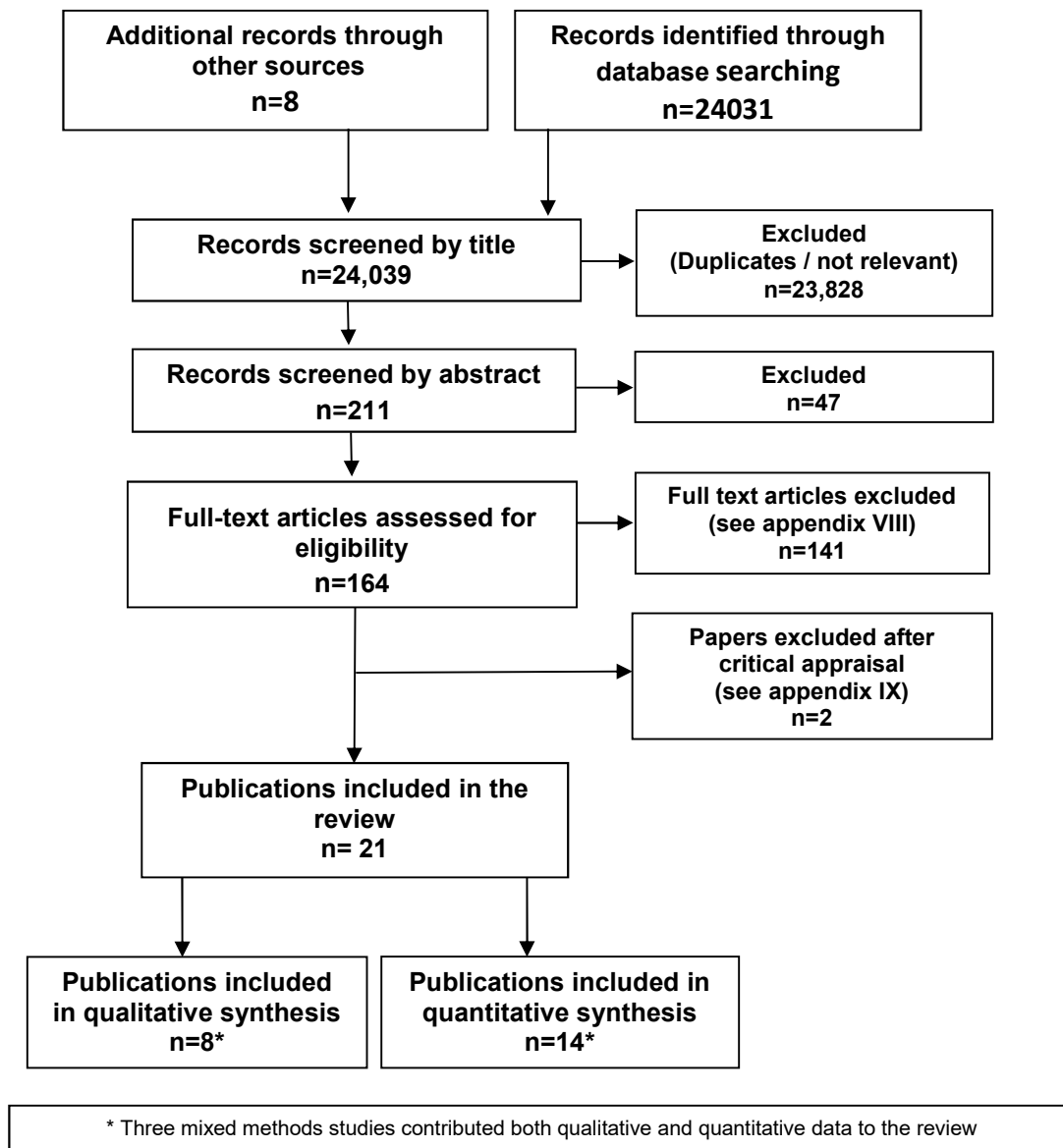
Meta synthesis of qualitative findings was undertaken using JBI-QARI. This was a three-staged process: initially all findings were rated according to their credibility (Appendix VI) and grouped (Level 1 findings), then categorized on the basis of similarity in meaning (Level 2 findings); finally a meta-synthesis was carried out to generate a single comprehensive set of (Level 3 findings) that can be used as a basis for evidence-based practice. The synthesized findings were drafted by the second reviewer then discussed with the primary author for validation before gaining agreement from the third author.

The findings of each single-method synthesis included in this review were aggregated as set out in the specific JBI reviewers manual for JBI mixed methods reviews.<sup>28</sup> This involved the configuration of the findings to generate a set of statements that represented this aggregation, coding the quantitative findings and attributing a thematic description to all quantitative data; assembling all of the resulting themes from quantitative and qualitative syntheses; followed by configuration of these themes to produce a set of synthesized findings in the form of a set of recommendations or conclusions.

## Results

### Description of studies

There were 24,039 studies identified as being potentially relevant to the review (24,031 from databases, 6 from reference lists and two from author searching). After a review of the title, 23,828 were excluded; these were duplicates or deemed not relevant based on eligibility criteria (for example; diabetes, pregnancy, HIV etc). A further 47 records were excluded following a review of each abstract. Full text was retrieved for 164 publications. All of these publications were reviewed against the eligibility criteria using a screening tool designed specifically for the study (Appendix VII). One hundred and forty-one publications did not meet eligibility criteria and the reasons for exclusion are reported in Appendix VIII. A further two studies were excluded after critical appraisal (Appendix IX). This left 21 publications covering 19 studies that were deemed suitable for inclusion in the review (Figure 1) and included eleven quantitative studies (reported across twelve papers),<sup>10,14,15,18-20,29-34</sup> five qualitative studies,<sup>35-39</sup> and three mixed methods studies (reported across four papers)<sup>25,40-42</sup>. The three mixed methods studies contributed both qualitative and quantitative data to the review and are counted in both data types as noted by the asterisk in Figure 1.

**Figure 1: Flow of studies**

An overview of the included studies is shown in Appendix X.

#### *Country of research*

The majority of studies were conducted in the United Kingdom (n=7 studies, across 8 publications)<sup>18,19,25,31,35,36,39,41</sup> and Australia (n=9);<sup>10,20,32-34,37,38,40,42</sup> the remaining were conducted in the United States of America (USA) (n=2),<sup>14,15</sup> and Canada (n=1 study, across 2 publications).<sup>29,30</sup>

#### *Study designs*

Two qualitative studies specified the qualitative methodology or underpinning philosophy being employed which was normalization process theory<sup>35</sup> or action research methodology.<sup>39</sup> The remaining six studies (across 7 publications) adopted a qualitative approach to data collection and analysis.<sup>25,36-38,41,42</sup> The included quantitative studies encompassed a range of study designs; randomized control trials (n=2);<sup>19,31</sup> controlled trial (n=1);<sup>15</sup> quasi-experimental using two different comparison groups (n=1);<sup>18</sup> before and after (n=2);<sup>24,34</sup> single group case series (n=2);<sup>20,40</sup> observational study without a control group (n=1 study across two publications);<sup>29,30</sup> cross sectional

study(n=2),<sup>33,42</sup>, observation study-case series (n=1)<sup>10</sup> and descriptive evaluation studies (n=2 studies, across three publications).<sup>14,25,41</sup>

For those qualitative studies (including three from mixed methods) that conducted interviews (n=6 studies across seven publications)<sup>25,35,36,39-41</sup> the number of participants was between fifteen<sup>40</sup> and fifty three.<sup>35</sup> The number of participants for those studies (including one from mixed methods) that participated in focus groups<sup>38</sup> was five (one focus group conducted)<sup>35</sup> between twenty two<sup>37</sup> and forty<sup>39</sup> (three focus groups conducted); thirty eight<sup>41</sup> (four focus groups conducted reported across two publications) and ninety eight<sup>38</sup> (seventeen focus groups conducted). Three studies undertook informal observations of mealtimes for between six<sup>39</sup> and thirty three<sup>36</sup> participants. The combined total across all qualitative studies was 431 participants.

The number of participants in the quantitative studies (including those from three mixed methods studies) was between 22<sup>33</sup> and 592,<sup>19</sup> one other further study reported on 1632 patient mealtime encounters for 1012 participants.<sup>32</sup> The combined total across all quantitative studies was 2790 participants.

### *Participants*

Qualitative studies were conducted with a number of different participants, these included:

- patients,<sup>25,35,36,39-42</sup>
- carers,<sup>35</sup>
- relatives,<sup>25,41</sup>
- volunteers,<sup>25,41</sup>
- a variety of health care professionals (clinical staff),<sup>35</sup> (nurses),<sup>25,38,41</sup> (food service assistants),<sup>38</sup> (professionals allied to medicine),<sup>35,37,38</sup> or (stakeholder representatives).<sup>35,38</sup>
- Catering staff<sup>35</sup>

Very sparse patient details were reported with patients described as being older patients<sup>39</sup> or being over 65 years of age.<sup>35,36</sup> Gender was not reported relating to individual patients across any of the studies.

Quantitative studies were conducted with a number of participants and included:

- patients,<sup>10,15,18,19,29-32,34,40,42</sup>
- volunteers,<sup>14,20,25,40,41</sup>
- a variety of health care professionals (nurses),<sup>20,40,42</sup> (doctors),<sup>42</sup> or (stakeholder representatives).<sup>33</sup>

Very sparse patient details were reported for four studies (across five publications)<sup>14,15,19,25,41</sup> with patients only being described as older adults (>65 years).<sup>14</sup> Mean age was reported for seven studies (across eight publications)<sup>10,20,29,30,32,34,40,42</sup> and ranged from 65<sup>32</sup> to 89<sup>20</sup> years. The majority of patients (51%<sup>34</sup> to 75%<sup>40</sup>) across all the quantitative studies were female.<sup>10,19,20,25,29,30,32,34,40-42</sup>

### *Setting*

Two studies (across three publications) were conducted within rehabilitation units.<sup>29,30,42</sup> The remaining studies were conducted within hospitals wards or units; from across a minimum of one ward<sup>10,14,20,31,39</sup> to a maximum of six wards<sup>32</sup> within the same hospital, to data collected from multiple hospitals (for example two hospitals,<sup>36</sup> four hospitals<sup>35</sup> and a nationwide survey conducted across 184 hospitals<sup>33</sup>). The study by Walton et al.<sup>38</sup> reported that it was to be conducted across public and private hospitals and no further details were provided.

### *Phenomena of interest*

Specific phenomena of interest addressed by qualitative studies were the experience of extrinsic and intrinsic factors that influence mealtime support:

- Environmental factors and mealtime services associated with adequate food consumption in hospitals from multiple perspectives<sup>35,42</sup>

- Improving mealtime experience of older people in a hospital setting from a nursing perspective<sup>39</sup>
- Experiences of volunteer feeding assistance programmes from the perspective of the patients, volunteers and nursing staff<sup>25,40,41</sup>
- Healthcare staff and key stakeholders perceptions and explanations for poor nutritional intake<sup>37,38</sup>
- Inpatients experience of access to food in hospitals and feeding assistance<sup>36</sup>

### *Interventions*

Three studies investigated the effectiveness of employed assistants to facilitate patients eating and feeding at mealtimes<sup>19,31,34</sup> across a range of outcomes (see below for description of outcomes). The intervention in the randomized control trial by Duncan et al.<sup>31</sup> was nutrition support, this was provided by two dietetic assistants who had undergone fourteen days of training and were on the ward six hours a day / seven days a week. Feeding assistance involved preparing the patient, encouragement and feeding. For the other randomized control trial<sup>19</sup> feeding assistance was provided by healthcare assistants who had undergone fifteen hours of training and were available five days a week to cover two meals. Feeding assistance involved preparing the patient, opening packets, cutting up food, encouragement and feeding.

The before and after study by Young et al.<sup>34</sup> involved three different interventions. The first involved the introduction of protected mealtimes with no change in staffing levels and non-urgent activities and limited interruptions at mealtimes, all members of the multi-disciplinary team were available to encourage and assist patients with nutritional intake. All staff received twenty-five hours in-service training. The second intervention involved the introduction of one additional assistant in nursing per ward. These additional assistants received fifteen hours of training and their role was to assist patients with meals and between meal snacks. The final intervention was a combination of protected mealtimes and the additional assistant in nursing. Patients in the study were observed on a single day, between day three and day seven of admission, across breakfast, lunch and dinner.

Five studies investigated the effectiveness of using trained volunteers to provide mealtime assistance<sup>14,15,20,32,40</sup> for older patients (>65 years) across a range of outcomes (see page 11 for description of outcomes). A further two studies (reported across three papers) described or explored the experiences and perspectives of volunteers providing feeding assistance.<sup>14,25,43</sup> Volunteers across all studies were trained and this varied from three hours,<sup>15</sup> half a day,<sup>25,41</sup> or three sessions.<sup>14</sup> The length of training was not reported for four studies.<sup>15,20,32,40</sup>

Two studies (reported across three papers) investigated the effectiveness of older patients (>65 years) eating in a dining room<sup>18,29,30</sup> across a range of outcomes (see page 11 for description of outcomes).

### *Types of outcomes*

For the experimental studies the outcomes examined are as follows. Eight studies<sup>15,18-20,31,32,34,40</sup> examined the effect of the described intervention on energy intake and six of these<sup>18-20,32,34,40</sup> also described protein intake. Nutritional status was measured in three of the studies<sup>19,31</sup> using a variety of anthropometric measures, including weight,<sup>18,19,31</sup> BMI,<sup>19</sup> mid-arm circumference (MAC),<sup>19,31</sup> mid-arm muscle circumference (MAMC),<sup>19</sup> hand grip dynamometry,<sup>19,31</sup> and triceps skinfold thickness (TSFT)<sup>19,31</sup> and biochemical markers; haemoglobin,<sup>31</sup> lymphocyte count<sup>31</sup> and serum albumin.<sup>19,31</sup> Length of stay in hospital and mortality rates were considered in two studies,<sup>19,31</sup> the number of post-operative complications was reported in one study<sup>31</sup> and infection rates in one study.<sup>19</sup>

Areas of interest addressed by the both the descriptive components of the quantitative studies and the qualitative the studies were as follows. Barriers to eating were described across two studies.<sup>40,42</sup> Facilitators to eating were described across eight studies<sup>10,14,20,32,40-42</sup> these included tray set up,<sup>32</sup> social interaction,<sup>40,42</sup> location<sup>42</sup> and sufficient time to eat.<sup>10,14,20,32,33,40,42</sup> Barriers to providing feeding assistance were explored across three studies<sup>10,40,42</sup> including negative interruptions,<sup>32,34,40,42</sup> and facilitators to providing feeding assistance in three studies,<sup>32-34</sup> including positive interruptions<sup>33</sup> and protected mealtimes.<sup>32,34</sup> Four studies explored the type of assistance needed.<sup>10,33,40,42</sup> A further two studies addressed the experiences of volunteers and one looked at their training and support needs.<sup>41</sup>

## Methodological quality

When a study met a criterion for inclusion (for example; 10 items for RCTs, 7 items for comparable cohort /case control studies, 7 for descriptive/case series studies and 10 for qualitative studies) a score of 1 was given. Where a particular point for inclusion was regarded as “unclear” it was given a score of 0. Where a particular point for inclusion was regarded as “not applicable” this point was taken off the total score. All included studies were assessed using this method and their overall critical appraisal scores presented. Studies were only excluded if they scored 0 using this approach. Studies that scored below 4 were still included given their relevance to the area of inquiry and the overall limited number of retrieved records included in the synthesis.

### Randomized control pseudo-randomised trials

The two studies included in the final synthesis scored seven and six when assessed against the ten critical appraisal questions applicable to randomized control and pseudo-randomized trials. However, Q2 and Q3 are not applicable for feeding assistance interventions as both the participants and the allocator will have to know the treatment allocation (feeding assistance). For the study by Duncan et al.<sup>31</sup> it was unclear whether those assessing outcomes were blind to the treatment allocation. The authors were contacted in order to provide further clarity, but a response was not forthcoming. The critical appraisal scores for each of the two appraised studies are outlined below in Table 1.

**Table 1: Critical appraisal scores for randomized control/ pseudo-randomized trials**

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
Duncan et al. 2006 <sup>31</sup>	Y	N/A	N/A	Y	UC	Y	Y	Y	Y	Y	7/8
Hickson et al. 2004 <sup>19</sup>	Y	N/A	N/A	Y	N	N	Y	Y	Y	Y	6/8

Y=Yes, N=No, N/A=not applicable, UC=unclear

### Comparable cohort/case control studies

One study included in the final synthesis scored two and the other two scored five against the nine critical appraisal questions applicable to comparable cohort / case control studies. However Q6 and Q7 were not applicable as the studies did not have a follow up period and no patients withdrew. For the study by Robinson et al.<sup>15</sup> the authors did not provide any information on patient selection or details of the outcome measures used or details or how the analysis was conducted. The authors were contacted in order to provide further clarity, but a response was not forthcoming. Details of whether bias was minimized or whether any confounding factors were identified was not provided for the study by Wright et al.<sup>18</sup> The critical appraisal scores are outlined below in Table 2.

**Table 2: Critical appraisal scores for comparable cohort /case control studies**

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Score
Robinson et al. 2002 <sup>15</sup>	UC	Y	UC	Y	UC	N/A	N/A	UC	UC	2/7
Wright et al. 2006 <sup>18</sup>	Y	Y	N	N	Y	N/A	N/A	Y	Y	5/7
Young et al. 2013 <sup>34</sup>	Y	N	N	Y	Y	N/A	N/A	Y	Y	5/7

Y=Yes, N=No, N/A=not applicable, UC=unclear

### Descriptive/case series studies

Ten studies were included in the final synthesis and scored between one and five. However Q6 and Q7 were not applicable as the studies did not have a follow up period and no patients withdrew. Only two studies had a comparison group, so Q5 was not applicable for eight studies. None of the studies were based on a random or pseudo-random sample, only six studies clearly defined the criteria for inclusion and only two studies identified any confounding factors. Eight studies provided clear details of the outcome measures being used. It was only clear in seven of the studies that outcomes were

measured in a clear way and three studies did not use appropriate statistical analysis in that they did not provide sufficient detail or what they had done. The authors were contacted in order to provide further clarity for the unclear responses, but a response was not forthcoming. The critical appraisal scores are outlined below in Table 3.

**Table 3: Critical appraisal scores for descriptive/case series studies**

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Score
Buys et al. 2013 <sup>14</sup>	N	N	N	Y	N/A	N/A	N/A	Y	Y	3/6
Dube et al. 2007 <sup>29</sup>	N	Y	Y	Y	N/A	N/A	N/A	Y	N	4/6
Huxtable and Palmer 2013 <sup>32</sup>	N	Y	N	Y	Y	N/A	N/A	Y	Y	5/7
Manning et al. 2012 <sup>40</sup>	N	Y	N	Y	Y	N/A	N/A	Y	Y	5/7
Paquet et al. 2008 <sup>30</sup>	N	Y	Y	Y	N/A	N/A	N/A	Y	N	4/6
Roberts et al. 2014 <sup>41</sup>	N	N	N/A	UC	N/A	N/A	N/A	UC	Y	1/5
Tsang 2008 <sup>10</sup>	N	Y	N	Y	N/A	N/A	N/A	Y	Y	4/6
Walton et al. 2008 <sup>20</sup>	N	N	N	Y	N/A	N/A	N/A	Y	N	2/6
Walton et al. 2012 <sup>33</sup>	N	Y	N	Y	N/A	N/A	N/A	UC	Y	3/6
Walton et al. 2013 <sup>42</sup>	N	N	N	UC	N/A	N/A	N/A	U/C	Y	1/6

Y=Yes, N=No, UC = unclear, N/A=not applicable, UC=unclear

### Qualitative studies

Nine studies were included in the final synthesis and scored between three and eight against the ten critical appraisal questions applicable to qualitative studies. For the mixed method study by Manning et al.<sup>40</sup> the only details provided for the qualitative component were that informal interviews were conducted with patients. The study that scored four<sup>41</sup> was a mixed methods study and provided limited data on how the volunteers were recruited and the authors claims in the conclusions were unclear. Only one study<sup>38</sup> provided a clear statement locating the researcher culturally or theoretically. None of the studies discussed the influence of the researcher on the research or vice-versa. Two studies did not give a clear representation of the participants voices,<sup>25,40</sup> and there was insufficient data to provide an answer to this question for a further two studies.<sup>38,47</sup> The critical appraisal scores are outlined below in Table 4.

**Table 4: Critical appraisal scores for qualitative studies**

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
Dickinson et al. 2008 <sup>39</sup>	Y	Y	Y	Y	Y	N	N	Y	Y	Y	8/10
Heaven et al. 2013 <sup>35</sup>	Y	Y	Y	Y	Y	N	N	Y	Y	Y	8/10
Manning et al. 2012 <sup>40</sup>	N	Y	Y	N	N	N	N	N	Y	N	3/10
Naithani et al. 2008 <sup>36</sup>	Y	Y	Y	Y	Y	N	N	Y	Y	Y	8/10
Roberts et al. 2014 <sup>41</sup>	UC	Y	Y	Y	UC	N	N	N	Y	UC	4/10
Robison et al. 2015 <sup>25</sup>	UC	Y	Y	Y	N	N	N	Y	Y	N	5/10
Ross et al. 2011 <sup>37</sup>	UC	Y	Y	Y	Y	N	N	Y	Y	Y	6/10
Walton et al. 2013 <sup>42</sup>	N	Y	Y	Y	Y	N	N	UC	Y	Y	6/10
Walton et al. 2006 <sup>38</sup>	UC	Y	Y	Y	N/A	Y	N	UC	Y	Y	6/9

Y=Yes, N=No, UC=Unclear, N/A=not applicable

## Levels of Evidence

Each study was then ranked into one of four levels which was dependant on study design (High – Level one, Moderate – Level two, Low - Level three, Very Low – Level four). The numbers of studies in each level are included in appendix XI. The majority of the studies found were low quality - level three studies (a. Cohort studies (with control group); b. Case controlled; c. Observational studies (without control group)).

## Findings of the Review

An extensive search of the literature identified 19 studies (reported across 21 papers) that met the review's inclusion criteria, details of which are reported in Appendix X.

## Results of the effectiveness component of the review (Objective 1)

Nine studies (reported across ten papers) investigated different types of interventions and used different outcomes to assess their effectiveness and were too diverse to undertake a meta-analysis. In order to address objective one a narrative summary is reported below.

## Energy intake

Seven studies<sup>18-20, 31-32,34,40</sup> reported changes in mean energy intake between intervention groups when compared to their respective control groups and the findings are presented in table 5, One study reported changes in mean energy intake as a percentage<sup>15</sup> and the final study (reported across two papers). One further study (reported across two papers) was an observational case series of patients' social interactions in a communal dining room and energy intake<sup>29,30</sup> and examined the average distributions of daily energy intakes over breakfast, midday and evening meals. Four of the included studies<sup>15,18,31,40</sup> showed a statistically significant increase in energy intake in the intervention groups when compared to their respective control groups. Two studies<sup>15,31</sup> examined daily energy intake and the other two studies<sup>18,40</sup> examined lunch time energy intake.

**Table 5: Summary of breakfast, lunch, dinner and daily mean energy intake (Kilojoules) across studies**

Author Time of meal	Control	Intervention	Significance	Study type / Intervention Outcome measure
	n Mean intake (SD)	n Mean intake (SD)		
Wright et al. <sup>18</sup> Lunch	n=18 1506 Range (1209-1874)	n=30 2045 Range (1833-2318)	<b>p=0.013</b>	Quasi-experimental Dining room with employed assistants Unweighed food intake utilized food record charts
Walton et al. <sup>20</sup> Lunch Daily	n=9 1261±772 3784±1800	n=9 1700±897 4018±1244	p=0.072 p=0.509	Single group case series Volunteer feeding assistance Weighed food intake
Manning et al. <sup>40</sup> Lunch Daily	n=23 1334±954 4078±2771	n=23 1730±891 4526±2349	<b>p=0.005</b> p=0.113	Single group case series Volunteer feeding assistance Weighed food intake
Duncan et al. <sup>31</sup> Daily	n=165 3163±1669	n=153 4623±1510	<b>p&lt;0.001</b>	Randomized control trial Employed assistants Weighed food intake
Huxtable and	n=367	n=431		Before and after Protected mealtimes with

Palmer <sup>32</sup>	1203 $\pm$ 50	1282 $\pm$ 54	p=0.148	multiple initiatives including volunteer feeding assistance Unweighed food intake using observations
Breakfast	1585 $\pm$ 639	1531 $\pm$ 621	p=0.254	
Lunch	1491 $\pm$ 747	1543 $\pm$ 703	p=0.468	
Dinner	1466 $\pm$ 660	1467 $\pm$ 635	p=0.979	
Daily				
Hickson et al. <sup>19</sup>	n=300 5410	n=292 5780	p=0.53	Randomized control trial Employed assistants Weighed food intake and food record charts for breakfast and snacks for 6%
Young et al. <sup>34</sup>	n=115 5011 $\pm$ 1774	n=139 4957 $\pm$ 2237 (n=39) 5574 $\pm$ 1965 (n=58) 5618 $\pm$ 2540 (n=42)	p=0.16	Before and after study I1: protected mealtimes I2: employed assistant I3: protected mealtimes and employed assistant

Key: SD – standard deviation, I - intervention

#### *Daily energy intake*

Of the seven studies that examined daily energy intake<sup>15,19,20,31,32,34,40</sup> only two<sup>15,31</sup> demonstrated an increased mean energy intake and a third study found that patients met their daily energy intake or exceeding their daily energy requirements.<sup>34</sup> In the study by Duncan et al.<sup>31</sup> those patients with acute non-pathological hip fractures in the intervention arm who had dietetic assistants available 7 days a week to facilitate at mealtimes had a significant increase in energy intake of 349kcal (1465.8kJ) per 24 hours compared to those patients in the control arm group who did not receive assistance (p<0.001). Robinson et al.<sup>15</sup> demonstrated that those patients fed by volunteers had a significantly higher percentage mean energy intake of 58.88% compared to those fed by nursing staff of 32.45%, nearly doubling their intake (p< 0.001) with a mean difference of 26.43g (95% CI 15.76 to 37.10). Four of the remaining studies<sup>19,20,32,40</sup> demonstrated non-significant increases in daily energy intake. However, there were no significant differences in mean energy intakes between intervention groups for the patients in the study by Young et al.<sup>34</sup> even when adjusted for differences in patient characteristics between groups (p=0.38). When energy intake was compared with energy requirements, significantly more patients from any of the intervention groups (protected mealtimes, assistant in nursing to assist with feeding or both) had adequate energy intake compared with pre-intervention patients (Odds ratio 3.4 95%CI 1.3-8.7, p=0.001), although no statistical difference was seen between any of the intervention groups, p=0.029. The final study (reported across two papers)<sup>29,30</sup> did not find a significant association between the nature and type of different social exchanges taking place whilst patients were eating in a communal dining room and patients' energy intake.

#### *Lunch time energy intake*

In the study by Wright et al.<sup>18</sup> comparing eating locations, the mean energy intake at lunch time on weekdays was found to be significantly greater 129kcal (541.8kJ) for patients who ate in a dining room with a nursing assistant offering support and encouragement (but not actual feeding assistance), when compared to those who ate by their bedside or in bed (p <0.013). In the study by Manning et al.<sup>40</sup> patients were assisted by volunteers and acted as their own controls. When volunteers were present the average lunchtime energy intake increased significantly by 396Kcal (p=0.005).

#### *Breakfast and dinner time energy intake*

Only one study<sup>32</sup> investigated energy intake at breakfast or dinner time, this showed non-significant increases in intake on both occasions.

#### **Protein intake**



Six studies<sup>18-20, 32,34,40</sup> reported changes in mean protein intake between intervention groups when compared to their respective control groups and the findings are presented in table 6. One further study (reported across two papers) was an observational case series of patients' social interactions in a communal dining room and protein intake<sup>29,30</sup> and examined the average distributions of daily protein intakes over breakfast, midday and evening meals. Three of the included studies,<sup>20,32,40</sup> showed a statistically significant increase in protein intake in the intervention groups when compared to their respective control groups. Two studies examined lunch time intake and daily energy intake,<sup>20,40</sup> and one study examined breakfast energy intake.<sup>32</sup>

**Table 6: Summary of breakfast, lunch, dinner and daily mean protein intake (grams) across studies**

Author Time of meal	Control	Intervention	Significance	Study type / Intervention Outcome measure/s
	n Mean intake Range	n Mean intake Range		
Wright et al. <sup>18</sup> Lunch	n=18 17.7 13.2-22	n=30 18.9 16.6-21	p=0.63	Quasi-experimental Dining room with employed assistants Unweighed food intake utilized food record charts
	n Mean intake (SD)	n Mean intake (SD)		
Walton et al. <sup>20</sup> Lunch Daily	n=9 15.2±12.3 39.8±21.1	n=9 25.3±15.8 50.5±20.3	<b>p=0.015</b> <b>p=0&lt;0.05</b>	Single group case series Volunteer feeding assistance Weighed food intake
Manning et al. <sup>40</sup> Lunch Daily	n=23 17.5±11.4 43.0±27.6	n=23 21.8±10.2 51.7±25.7	<b>p=0.009</b> <b>p=0.004</b>	Single group case series Volunteer feeding assistance Weighed food intake
Huxtable and Palmer <sup>32</sup> Breakfast Lunch Dinner Daily	n=367 12±6 17±7 17±7 15±7	n=431 10±5 17±7 16±8 15±7	<b>p=0.025</b> p=0.771 p=0.447 p=0.482	Before and after Protected mealtimes with multiple initiatives including volunteer feeding assistance Unweighed food intake using observations
Young et al. <sup>34</sup> Daily I1 Daily I2 Daily I3	n=115 49±19 49±19 40±19	n=139 43±21 43±19 51±22	p=0.07	Before and after study I1: protected mealtimes I2: employed assistant I3: protected mealtimes and employed assistant
	n Mean intake	n Mean intake		
Hickson et al. <sup>19</sup> Daily	n=300 47	n=292 50	p=0.62	Randomized control trial Employed assistants Weighed food intake and food record charts for breakfast and snacks for 6%

Key: SD – standard deviation, I - intervention

### *Daily protein intake*

Of the six studies (reported across seven papers) that examined daily protein intake,<sup>19,20,29,30,32,34,40</sup> three studies (reported across four papers) demonstrated an increased mean protein intake.<sup>20,29,30,40</sup> In the pilot study by Walton et al.<sup>20</sup> patients were assisted by volunteers and acted as their own controls. When volunteers were present the average daily protein intake increased significantly by 10.7g ( $p=0.015$ ). This pilot study informed the study by Manning et al.<sup>40</sup> and used the same study design with a much larger sample. When volunteers were present the average daily protein intake increased significantly by 8.7g ( $p=0.004$ ). However, the sample sizes for both these studies were very small ( $n=9$ )<sup>20</sup> and ( $n=23$ )<sup>40</sup>. The final study (reported across two papers)<sup>29,30</sup> found a positive link between the nature and type of different social exchanges taking place whilst patients were eating in a communal dining room and patients' protein intake. In particular, it revealed that patients' and providers' mutual reciprocation of their communal behaviours (e.g., agreeable behaviours responded to by agreeable behaviours) were predictive of more positive deviations from protein requirements (i.e. higher protein intakes) ( $p<0.005$ ). They also found that protein intake was impacted by the duration of time patients were in the dining room,  $p=0.0037$ .

Two of the remaining studies<sup>18,19</sup> demonstrated non-significant increases in daily protein intake when employed assistants were available to assist patients<sup>19</sup> or when patients are in a supervised dining room.<sup>18</sup> For the patients in the study by Young et al.<sup>34</sup> a trend toward improved protein intakes for patients in group 3 (protected mealtimes and assistant in nursing to assist with feeding), was seen, when the authors adjusted for differences in participant characteristics between groups, this trend was no longer apparent ( $p=0.20$ ).

### *Lunch time protein intake*

In the pilot study by Walton et al.<sup>20</sup> and the follow on study by Manning et al.<sup>40</sup> patients were assisted by volunteers and acted as their own controls. When volunteers were present the average lunchtime protein intake increased significantly by 10.1g ( $p=0.015$ ) and 4.3g ( $p=0.009$ ) respectively.

### *Breakfast time protein intake*

One before and after study found that mean protein intake for breakfast significantly increased by 2g ( $p=0.025$ ) after the introduction of protected mealtimes which incorporated a number of initiatives, including volunteer feeding assistance.<sup>32</sup>

## **Nutritional status**

Nutritional status was measured by means of anthropometric measures in three of the included studies.<sup>18,19,31</sup> Two studies investigated the change in the measures between admission and discharge,<sup>18,19</sup> and the other between admission and four month follow up.<sup>31</sup>

### *Weight and Body Mass Index*

None of the interventions were able to show significant effects on weight or BMI (see table 7). Wright et al.<sup>18</sup> did demonstrate that there was a trend towards a greater number of people gaining weight in the dining room group (dining room: three lost weight and 14 gained; control: seven lost weight and nine gained,  $p=0.12$ ).

**Table 7: Summary of weight gain across studies**

Study	Control	Intervention	Significance
Hickson et al. <sup>19</sup> BMI (kg/m <sup>2</sup> )	Median [IQR] -0.3 [-2.8-1]	Median [IQR] -0.7 [-2.5-0.8]	p=0.68
Hickson et al. <sup>19</sup> Weight (kg)	Median [IQR] -0.1 [-0.9-0.4]	Median [IQR] -0.3 [-0.9-0.3]	p=0.23
Duncan et al. <sup>31</sup> Weight (kg)	Mean -1.00	Mean -0.35	p=0.16
Wright et al. <sup>18</sup> Weight (kg)	Mean 0.25 (95% CI: 1.0 to 1.2)	Mean 0.61 (95% CI: 0.13 to 1.09)	p=0.16

Key: IQR – Interquartile range

#### *MAM, MAMC, TSFT and Handgrip dynamometry*

A summary of MAM, MAMC, TSFT and Handgrip dynamometry across studies is shown in table 8. One study showed no difference in MAC, TSFT, NAMC or grip strength<sup>19</sup> for patients assisted by health care assistants compared to usual care for the period between admission and discharge. Duncan et al.<sup>31</sup> found that MAC and TSFT fell in both groups of patients for the period between admission and four month follow up. Only the decrease in MAC was shown to be statistically significant (p=0.002) and this decreased to a lesser extent in the group that received support from the dietetic assistants. The authors also measured TSF thickness and grip strength in both patient groups on admission and four months post discharge from hospital. Although triceps skinfold thickness decreased in both groups and mean handgrip strength increased these were both non-significant.

**Table 8: Summary of MAM, MAMC, TSFT and Handgrip dynamometry across studies**

Study	Control	Intervention	Significance
Duncan et al. <sup>31</sup> MAC (cm)	Mean -0.89	Mean -1.28	p=0.002
Hickson et al. <sup>19</sup> MAC (cm)	Median [IQR] 24.8[22.5-28.0]	Median [IQR] 24.9[21.7-28.7]	p=0.91
Duncan et al. <sup>31</sup> TSFT (mm)	Mean -0.88	Mean -1.22	p=0.087
Hickson et al. <sup>19</sup> TSFT (mm)	Median [IQR] 10.1[7.6-13.4]	Median [IQR] 11.3[8.2-15.5]	p=0.07
Hickson et al. <sup>19</sup> MAMC (cm)	Median [IQR] 21.7 [19.7-23.9]	Median [IQR] 21.1 [18.5-23.6]	p=0.11
Duncan et al. <sup>31</sup> Handgrip strength (Nm)	Mean +2.17	Mean +0.16	p=0.32
Hickson et al. <sup>19</sup> Handgrip strength (Nm)	Median [IQR] 15.0 [9.5-21.8]	Median [IQR] 12.9 [9.4-19.4]	p=0.14

Key: cm – centimetres; Nm - nanometer, IQR – interquartile range (is a measure of statistical dispersion, being equal to the difference between the upper and lower quartiles, IQR= Q<sub>3</sub>- Q<sub>1</sub>)

#### **Biochemical markers**

Two studies<sup>19,31</sup> investigated the impact of mealtime support provided by healthcare<sup>19</sup> or dietetic<sup>31</sup> assistants on laboratory indices. More favourable results were shown between admissions and follow-up for the routine nursing care group and the dietetic assistant support group<sup>31</sup> these were not statistically significant. No difference in serum albumin was found between the patients receiving mealtime assistance from healthcare assistants as opposed to usual care<sup>19</sup> the mean change for the healthcare assistant group was -0.16 g/l and for the usual care group -0.7 g/l (mean difference was 0.54 g/l (95% CI -0.46, +1.54), p=0.29 excluding a benefit from the intervention of more than 1.54 g/l

at the 5% level. Results from the sub-group analysis showed that in the intervention group the thinnest people gained albumin but lost weight.

### Length of stay

Two studies<sup>19,31</sup> reported on patient length of stay in hospital (Table 9), both of which evaluated the effectiveness of employed assistants and found no statistical difference in length of stay in hospital between patients assisted by employed assistants as compared to the control group of patients.

**Table 9: Summary of length of stay across studies**

Study	Control Days Median [IQR]	Intervention Days Median [IQR]	Significance
Duncan et al. <sup>31</sup> Acute Unit	n=141 17 [18]	n=139 16 [18]	p=0.44
Duncan et al. <sup>31</sup> Hospital	n=134 32 [49]	n=139 34 [18]	p=0.81
	Days Mean [Range]	Days Mean [Range]	
Hickson et al. <sup>19</sup> (admission to discharge)	n=300 23.0 [14–39]	n=292 21.0 [13–36]	p=0.41
Hickson et al. <sup>19</sup> (admission to medically fit for discharge)	n=300 17.0 [10–27]	n=292 17.0 [11–31]	p=0.45

### Complications

Only one study<sup>31</sup> examined the number of individuals having other complications (excluding mortality for patients after a hip fracture on a trauma ward and found no significant difference when dietetic assistants were available to provide mealtime assistance as opposed to patients who received usual care, p=0.29.

### Mortality rate

Two studies<sup>19,31</sup> looked at mortality rate as an outcome. The study by Duncan et al.<sup>31</sup> investigated deaths in the trauma unit, deaths in hospital and deaths at four months post discharge, whereas Hickson et al.<sup>19</sup> investigated deaths before discharge (Table 10). Patients who were receiving mealtime assistance from dietetic assistants were significantly less likely to die while they were in the acute trauma unit, p=0.048 or four months post discharge, p=0.036 than those receiving usual care, p=0.048.

**Table 10: Summary of mortality across studies**

	Control	Intervention	Significance
Duncan et al. <sup>31</sup> (Deaths in trauma unit)	10.1% (n=16)	4.1% (n=6)	p=0.048 Percentage difference 6.1 95% CI 0.08, 12.1
Duncan et al. <sup>31</sup> (Deaths in hospital)	14.6% (n=23)	8.2% (n=12)	p=0.084 Percentage difference 6.4 95% CI -1.0, 13.6)
Duncan et al. <sup>31</sup> (Deaths at 4 months)	22.9% (n=36)	13.1% (n=19)	p=0.036 Percentage difference 9.8 95% CI 1.1, 18.3
Hickson et al. <sup>19</sup> (Deaths before discharge)	10.6% (n=31)	11.7% (n=35)	p=0.69

## Infection rates

One study<sup>19</sup> looked at both the differences in the use of intravenous (IV) and subcutaneous (SC) fluids and the use of IV antibiotics and found significant differences between those patients receiving additional mealtime assistance by a health care professional and those receiving usual care. Those patients receiving additional mealtime assistance used on average 50% less IV or SC fluids than the control group,  $p=0.03$  but no longer reached significance when controlling for gender and MAMC at baseline,  $p=0.12$ . The average number of IV antibiotics prescribed was half the number for those patients receiving additional mealtime assistance compared to those receiving usual care  $p=0.02$  but no longer reached significance when controlling for gender and MAMC at baseline,  $p=0.08$ . Those patients receiving additional mealtime assistance were on IV antibiotics for a shorter time of four days compared to those receiving usual care which was six days,  $p=0.02$ . The difference in the total number of days on IV antibiotics increased in significance to  $p=0.007$  when controlling for gender and MAMC at baseline.

## Summary of effectiveness data

This review has shown that daily energy intake was significantly increased in older patients (>65 years) in hospital settings when employed assistants (Level 1c)<sup>31</sup> and trained volunteers (Level 2c)<sup>15</sup> were present to provide mealtime support. It has also shown that lunch time energy was significantly increased in older patients (>65 years) in hospital settings when trained volunteers were present to provide mealtime support (Level 4b)<sup>40</sup> or when older patients (>65 years) ate in a supervised dining room compared to those who ate at their bed area (Level 2c).<sup>18</sup> Daily protein intake was significantly increased in older patients (>65 years) in hospital settings when trained volunteers were present to provide mealtime support (Level 3d).<sup>20,40</sup> When older patients (>65 years) ate in a communal dining room there was a positive link between the nature and type of social exchanges and the duration of time older patients' (>65 years) were in the dining room and older patients' (>65 years) protein intake (Level 3e).<sup>29,30</sup> In addition lunch time (Level 3d)<sup>20,40</sup> and breakfast (Level 2d)<sup>32</sup> protein intake was significantly increased when trained volunteers were present to provide mealtime support. A significant improvement in nutritional status for older patients (>65 years) in hospital settings was seen when employed assistants (Level 1c)<sup>31</sup> were present to provide mealtime support. There was no evidence that mealtime support made any significant improvements in biochemical markers, length of stay or post-operative complication rate. However, a significant improvement in mortality four months post discharge for older patients (>65 years) in an acute trauma unit hospital settings when employed assistants (Level 1c)<sup>31</sup> were present to provide mealtime support was demonstrated.

## Results of the perceptions and experiences component of the review (Objective 2)

### Meta-synthesis of qualitative data

In order to identify the perceptions and experiences of older patients (>65 years) and those involved with their care with regard to assistance at mealtimes in hospital settings and rehabilitation units, a total of fifty-seven findings from eight qualitative studies (reported across nine papers)<sup>25,35-42</sup> were extracted and aggregated to form nine categories. The illustrations for each of these findings can be found in Appendix XII. Findings were categorized as Unequivocal (U) (forty nine findings), Credible (C) (one finding) or Unsupported (Un) (seven findings), see Appendix VI for definitions. The nine categories were further synthesized in a meta-synthesis which yielded three synthesized findings (Table 11).

**Table 11: Meta synthesized findings**

Findings	Categories	Synthesized findings
Qualified staff were often involved in other tasks during the mealtime and, therefore, unavailable to provide care to older patients (>65 years) (U)		
Older patients (>65 years) were aware of the limited number of staff available to provide help at mealtimes (U)		
Relatives commented on the lack of attention to older		

patients' (>65 years) needs with food being out of reach (U)	<p>Category 1</p> <p>Qualified staff were often unavailable to help older patients (&gt;65 years) at mealtimes due to competing priorities</p>	<p><b>Synthesis 1</b></p> <p><b>Competing priorities and interruptions related to ward activities had a negative impact at mealtimes for older patients (&gt;65 years)</b></p>
Feeding assistance was often a key topic in the accounts of older patients (> 65 years) and carers when discussing the problem of malnutrition in hospital (U)		
Hospital staff identified a range of barriers to effective feeding of older patients (>65 years), including limited time and staff numbers, competing priorities or conflicting policies and issues regarding needs of particular patient groups (U)		
Without support older patients (>65 years) developed their own strategies at mealtimes (U)		
A potential barrier to nutritional care of older patients (>65 years) was competing priorities at mealtimes (U)		
A potential barrier to nutritional care of older patients (>65 years) was that nurses felt a sense of powerlessness to prioritize nutrition in the hospital setting (U)		
Assisting and monitoring older patients (>65 years) at mealtimes seen as a low priority activity (U)		
Older patients (>65 years) need assistance and preparation to eat and registered nurses are busy at mealtimes and feeding support is often more appropriately delegated to other staff (U)		
Ward routines had a negative impact on mealtimes older patients (>65 years) (U)	<p>Category 2</p> <p>Interruptions related to ward activities had a negative impact at mealtimes for older patients (&gt;65 years)</p>	
Older patients (>65 years) who experienced physical difficulties felt powerless to complain when staff interrupted mealtimes (U)		
<b>Findings</b>	<b>Categories</b>	<b>Synthesized findings</b>
Assistance at meals was provided by staff for older patients (>65 years) especially with regard to opening packages (U)	<p>Category 3</p> <p>Assistance provided by staff to older patients (&gt;65 years) at mealtimes was seen as positive</p>	
Mealtimes were considered enjoyable following staff reflection and action learning on the process (U)		
Changes made to nursing practice meant that qualified nurses were available to assist older patients (>65 years) in mealtime care, this had a positive effect on both patients' and staff mealtime experience (U)		
Getting to know the older patients (>65 years) and taking the time to provide what was needed for individual patients' assessment emerged as a new aspect to assessment (U)		
Staff able to prioritize nutritional care and be actively involved in mealtimes. They were then in a position to observe and monitor what older patients (>65 years) were eating and any difficulties		

they were experiencing (U)		
Food work in hospital requires staff to follow procedures and all staff engaging in serving meals should be able to complete these routines but also involve taking the initiative and understanding the 'older patients' (>65 years) perspective and to empathically assist when necessary (U)		
Ward-based staff identified two older patient groups (>65 years) that required high levels of skill in feeding assistance and nutrition: those with swallowing difficulties following a stroke and patients with dementia. Feeding assistance was a valued activity, but the consequences of poor feeding activity were marked (U)		
Food work is often described as common sense by staff, but this leads it to being overlooked and undervalued in practice (U)		
Empowering ward leaders was considered important (Un)		
Staff suggestions for improving nutrition care of older patients (>65 years) included employing more staff on the wards at mealtimes (U)		
Additional assistance for older patients (>65 years) was provided by relatives and seen as a positive interruption (U)	Category 4 Relatives support for the older patients (>65 years) at mealtimes is positive and valued	
Working with older patients' (over 65 years) families, learning strategies from them and communicating these to the rest of the team was important (U)		
Staff suggestions for improving nutrition care of older patients (>65 years) included allow family members to be "extra hands" on the wards at mealtimes for older patients (>65 years) so staff would have more time for other tasks (U)		
Bedside was the most common eating location but dining rooms were utilised for mobile older patients (>65 years) at lunch and tea time (U)	Category 5 Social interaction for older patients (>65 years) can be positive	
Social interaction with other patients at mealtimes can be positive (U)		
Allied health rounds create interaction with older patients (>65 years) and can be positive (U)		
Nurses observed that social interaction was important (Un)		
Older patients (>65 years) saw volunteers as a regular presence with potential to build relationships (Un)		
Relatives were uncertain if their mother had been helped by a volunteer but welcomed the possibility, emphasising the benefits of encouragement and social interaction identified by staff (C)		
Some stakeholders talked of the possibility of older patients (>65 years) eating in dining rooms and the value of greater socialisation and a more usual eating		
		<b>Synthesis 2</b>  <b>Assistance at mealtimes for older patients (&gt;65 years) from staff, relatives and volunteers is effective and helpful</b>

environment (U)		
Nurses and volunteers considered that the voluntary feeding assistance program was effective and helpful for older patients (>65 years) (U)	Category 6 Volunteer programmes for older patients (>65 years are seen as positive and worthwhile)	
Staff described positive aspects of having trained volunteers who provided extra pairs of hands to support older patients (>65 years) enabling nurses to be available for other care (U)		
Volunteers saw that the time they offered made a difference to older patients (>65 years) and nurses (U)		
Staff and older patients (>65 years) appreciated that volunteers prepared all older patients (>65 years) for meals (U)		
Volunteers had no doubt that preparing all older patients (>65 years) for mealtimes was worthwhile (U)		
Nurses and volunteers recognised the benefit of having accurate information about patients' dietary intakes (Un)		
Nurses respected the volunteers and good relationships and a sense of teamwork developed (U)		
Nurses praised the volunteers attitudes and saw them as committed and reliable (Un)		
Nurses appreciate that the research team had trained the volunteers and took responsibility for them on the ward (U)		
Staff were hopeful that the volunteers would continue (U)		
Staff described an increased awareness of the importance of nutrition and mealtime care as a result of volunteers providing assistance at mealtimes (Un)		
Staff highlighted a synergy between other initiatives and the introduction of volunteers at mealtimes (U)		
The volunteers were very positive about their contribution (U)		
Volunteers were confirmed to be competent in each task (U)		
Nursing staff recognised the opportunity the trained volunteers gave them to perform other tasks (U)		
Patients and ward staff valued the volunteers' contributions (U)		
<b>Findings</b>	<b>Categories</b>	<b>Synthesized findings</b>
Volunteers thought that older patients (>65 years) respected them and might eat their meals but recognised that some patients will not eat despite encouragement (U)		



Volunteers felt that their role could be initially challenging but grew more fulfilling with time (U)	Category 7  Volunteers found their work with older patients (>65 years) could be challenging	<b>Synthesis 3</b>  <b>Providing assistance at mealtimes for older patients (&gt;65 years) can be challenging</b>
Volunteers did find it difficult and upsetting at times but appreciated the training and ongoing support provided by the research team (Un)		
Volunteers had a sense of achievement and valued the support they received when they were able to share their experience of mealtime assistance at coffee mornings and focus groups (U)		
Older patients (>65 years) and relatives observed in their observations of staff that there were limitations and challenges to providing assistance at mealtimes and relatives wished more help was available (U)	Category 8  Staff, patients and relatives recognised that providing assistance for older patients (>65 years) can be challenging	
Nurses highlighted a number of challenges and felt powerless to respond adequately at mealtimes and were unsure how to prioritize when so many older patients (>65 years) needed help (U)		
A potential barrier to nutritional care of older patients (>65 years) was poor knowledge of nutrition care processes, despite a shared awareness of the prevalence of malnutrition non-dietetic staff agreed they had limited nutritional knowledge and suggested a range of informal techniques for identifying patients' nutritional status (U)	Category 9  Lack of clarity around responsibility for feeding support for older patients (>65 years)	
A potential barrier to nutritional care of older patients (>65 years) was poor communication between disciplines (U)		
A potential barrier to nutritional care of older patients (>65 years) was lack of role clarity and shared responsibility (U)		

### **Synthesis 1: Competing priorities and interruptions related to ward activities had a negative impact at mealtimes older patients (>65 years)**

A total of twelve findings from six studies,<sup>25,35-39</sup> formed the two categories which were synthesized into synthesis one. Findings were grouped into two categories:

Category 1: Qualified staff were often unavailable to help at older patients (>65 years) mealtimes due to competing priorities.

The difficulties qualified staff experienced at mealtimes was identified in six studies<sup>25,35-39</sup> the findings reflecting that qualified staff would use mealtimes to complete other tasks. Mealtime assistance was seen as low priority and older patients (>65 years) often developed their own strategies. Dickinson et al.<sup>39</sup> used an action research design drawing in techniques from practice development to support the action phase. Prior to the action research cycle, mealtime care operated in a routinized and ritualistic way with little thought about the appropriateness or effectiveness of this style of practice and qualified nurses focused on tasks such as administering drugs and completing paperwork. One study<sup>35</sup> undertaken as part of a wider research study, the Multidisciplinary Approach to Addressing Malnutrition in hospital (MAPPMAL study) examined provision of food services at four UK hospital sites across two regional locations focusing on older patients (>65 years) admitted with dementia, stroke or fractured neck of femur. Hospital staff, patients and relatives identified the barriers faced by staff from other priorities at mealtimes. The Southampton Mealtime Assistance Study<sup>25</sup> conducted semi-structured interviews and focus groups with nurses, patients or close relatives and volunteers before and after introduction of volunteer mealtime assistants to help older patients (>65 years) on

one acute medical ward for older people, with a parallel comparison with older patients (>65 years) on an adjoining ward, in a UK hospital, and noted that before the intervention patients had to develop their own strategies at mealtimes. Ross et al.<sup>37</sup> explored staff perceptions and explanations for poor nutritional intake in older medical patients through three focus groups involving twenty two healthcare staff working on the acute medical wards of a larger tertiary teaching hospital and outlined the barriers that staff face from other priorities at mealtimes including drug rounds. Mealtimes viewed as a low priority was identified by Naithani et al.<sup>36</sup> who examined in-patients' experience of access to food in hospitals, whilst Walton et al.<sup>38</sup> found that registered nurses were busy at mealtimes and feeding support was often more appropriately delegated to other staff.

Category 2: Interruptions related to ward activities had a negative impact at mealtimes for older patients (>65 years).

Two studies<sup>42 36</sup> including two findings addressed this issue, Walton et al. 2013<sup>42</sup> identified environmental factors associated with achieving adequate food consumption in a hospital context. Both Walton et al.<sup>42</sup> and Naithani et al.<sup>36</sup> as described previously, noted that when ward activities continued during mealtimes the meal would be spoilt or left.

### **Synthesis 2: Assistance at mealtimes older patients (>65 years) from staff, relatives and volunteers is positive and helpful**

A total of thirty six findings from eight studies reported in nine papers<sup>25,35-41</sup> formed four categories which were synthesized into synthesis two. This synthesis reflects that all mealtime support was valued, whether this was staff, volunteers, or relatives. Findings were grouped into four categories.

Category 3: Assistance provided by staff at mealtimes older patients (>65 years) was seen as positive.

Ten findings across five studies described in the previous categories above<sup>25,35,37,39,42</sup> identified how staff prioritising mealtimes and feeding assistance has a positive effect on both patients' and staff mealtime experience.

Category 4: Relatives support at mealtimes older patients (>65 years) is positive and valued.

It was identified in three findings across three studies<sup>37,39,42</sup> that encouraging relatives to help with providing assistance could be beneficial as this allows staff to have more time for other tasks. Additionally the findings acknowledged that learning strategies from the family and communicating this to the ward staff is important.

Category 5: Social interaction older patients (>65 years) can be positive.

Social interaction through a range of activities was identified as a positive strategy in seven findings across three studies across both hospital settings and rehabilitation units.<sup>25,38,42</sup> Patients and relatives valued the social interaction with other patients and volunteers at mealtimes. Staff thought that encouraging patients to socialize with other patients through the use of a dining room would encourage patients to eat more and create a more usual eating environment.

Category 6: Volunteer programmes older patients (>65 years) are seen as positive.

Sixteen findings were included in this category. The use of volunteers was a focus of two studies reported in three papers.<sup>25,40,41</sup> This included a health services evaluation mixed methods study undertaken by Manning et al.<sup>40</sup> the aim of which was to evaluate the effectiveness of a voluntary feeding assistance program at improving patients' food intakes and the Southampton Mealtime Assistance Study<sup>25,41</sup> as described previously. Volunteer programmes to provide mealtime support are seen as positive by patients and staff. Volunteers feel like they make a difference and that what they do is worthwhile. Nurses appreciate the extra help at mealtimes which frees them up to attend to other tasks or feeding the more difficult patients.

### **Synthesis 3: Providing assistance at mealtimes for older patients (>65 years) can be challenging**

This synthesis was developed from three categories which included nine findings from two studies, described in three papers.<sup>25,37,41</sup> Findings were grouped into three categories.

Category 7: Volunteers found their work with older patients (>65 years) could be challenging.

The challenges volunteers face providing mealtime assistance was described in four findings from the two papers<sup>25,41</sup> discussing the results of the Southampton Mealtime Assistance Study. Focus groups were held with twelve out of twenty nine volunteers who delivered mealtime assistance. Volunteers felt that initially the work could be challenging especially if patients still didn't want to eat. It was often difficult and upsetting but they valued their training and ongoing support from other volunteers.

Category 8: Staff, patients and relatives recognised that providing assistance for older patients (>65 years) can be challenging.

Staff, patients and relatives recognised that providing assistance for older patients (>65 years) at mealtimes could be challenging. These challenges can leave nurses feeling powerless to prioritise nutrition in the hospital setting. This was discussed in two findings from one study<sup>25</sup> and was in relation to views expressed in the pre intervention year of the Southampton Mealtime Assistance Study through nine patient interviews and group and individual interviews with seventeen staff members.

Category 9: Lack of clarity around responsibility for feeding support.

This category included three findings from one study.<sup>37</sup> It was identified that communication and knowledge of nutrition care processes between disciplines was poor and staff felt that these factors acted as potential barriers to nutritional care of the elderly patients.

### **Summary of meta synthesis of qualitative data**

A total of twelve findings were grouped into two categories from which the first synthesis was derived which showed that competing priorities and interruptions related to ward activities had a negative impact at mealtimes for older patients (>65 years). For the second synthesized finding, thirty six findings were grouped into four categories that established that patients found assistance at mealtimes for older patients (>65 years) from staff, relatives and volunteers were effective and helpful. Synthesis three comprised of nine findings grouped into three categories and acknowledged that providing assistance at mealtimes for older patients (>65 years) can be challenging.

The first synthesis reflects the experience of staff, patients and relatives of the impact of ward related activities which interrupt mealtimes. The evidence demonstrated that qualified staff were often unavailable to help older patients (>65 years) at mealtimes due to competing priorities and when ward activities continued during mealtimes the meal would be spoilt or left.

Synthesis two identified that when staff prioritized mealtimes and feeding assistance for older patients (>65 years) this had a positive effect on both patients' and staff. The data showed that for older patients (>65 years) assistance provided by staff at mealtimes was seen as positive. Staff recognized that encouraging relatives to help with providing assistance for older patients (>65 years) was beneficial. Social interaction with other patients through the use of a dining room or with volunteers was identified as a positive strategy that would encourage older patients (>65 years) to eat more. The data also showed that volunteer programmes to provide mealtime support for older patients (>65 years) were seen as positive by patients and staff. Volunteers felt they made a difference and that what they did was worthwhile. Nurses appreciated the extra help at mealtimes for older patients (>65 years) which freed them up to attend to other tasks or feeding more complex patients.

The third synthesis acknowledged the challenges faced by staff, patients and relatives. The data showed that volunteers found their work with older patients (>65 years) could be challenging, but that training and ongoing support was valued. The synthesis also demonstrated that staff, patients and relatives recognised that providing assistance at mealtimes for older patients (>65 years) could be challenging. These challenges left nurses feeling powerless to prioritise nutrition within the hospital setting. It was identified that there was a lack of clarity around responsibility for feeding support. In particular communication and knowledge of nutrition care processes between disciplines was poor and staff felt that these factors acted as potential barriers to nutritional care of elderly patients.

## **Narrative synthesis of quantitative data (objective 2)**

In order to further identify the perceptions and experiences of older patients (over 65 years) and those involved with their care with regard to assistance at mealtimes in hospital settings and rehabilitation units the findings from ten quantitative studies<sup>10,14,20,25,32-34,40-42</sup> were extracted and coded (see Appendix XIII). Areas of interest addressed by studies were barriers to eating, facilitators to eating, barriers to providing feeding assistance, facilitators to providing feeding assistance and the experiences of volunteers. The findings are reported as a narratively synthesis within and across studies.

### **Barriers to eating**

Barriers to eating were reported across two studies.<sup>40,42</sup> Walton et al.<sup>42</sup> conducted observations of the daily mealtime routines of thirty elderly patients in rehabilitation wards in Australian hospitals and surveyed staff and patients to clarify that the observed activities were accurate. Observations of patients revealed that opening food and beverage packaging was the largest negative factor at each main meal. Other factors included inappropriate tray and/or patient position at meals, the presentation of the meals and the eating environment (i.e. in a ward rather than a dining room). Nurses identified a high level of packaging of the food, the presentation of the meals and the eating environment (i.e. in a ward rather than a dining room) as potential barriers to adequate dietary intake of patients along with patients being unwell and having a poor appetite.<sup>42</sup> Manning et al.<sup>40</sup> conducted a health services evaluation on the use of volunteers during weekday lunchtimes and observations of mealtimes. The main barriers to eating identified by nurses and volunteers were type and choice of meal, lack of time, patient's clinical condition and opening packages. About half the patients reported their appetite to be poor, and that hunger encouraged intake.<sup>40</sup>

### **Facilitators to eating**

Facilitators to eating were reported across seven studies.<sup>10,14,20,32,40-42</sup> Volunteers frequently perform tasks other than physical feeding that facilitate dietary intake for patients; for example encouragement, assistance with opening packaging, setting up the tray, socialisation and providing a favourite food.<sup>10,14,20,41,42</sup> Volunteers in the descriptive evaluation of the SPOONS feeding assistance program<sup>14</sup> reported that the most frequently performed volunteer tasks were social interaction (n=217, 93%), assistance with trays set up (69%), prompting to eat (68%) and passing out trays (31%). From the survey data of the experiences of volunteers another study reported that opening packages was identified as an important role to assist and encourage dietary intakes.<sup>42</sup> Positive influences for encouraging patients to eat occurred when dietitians, nutrition assistants or visitors came during mealtimes and assisted the patient with difficult packaging, helped to reposition the patient or put the meal try within reach.<sup>42</sup>

#### *Tray set up*

Having someone to ensure that trays are set up is important and Huxtable and Palmer<sup>32</sup> found that patients were more likely to consume at least half of the nutrient dense foods and drinks available if their meal was within reach (p=0.003).

#### *Social interaction*

Having company and social interaction during mealtimes is seen as a facilitator of the eating process. Nurses<sup>40</sup> and volunteers<sup>40,42</sup> both considered that that social interaction encouraged dietary intake in hospital.

#### *Location*

When given a choice 40% of patients on a rehabilitation ward preferred to use a dining room when available and observations indicated improved intakes when patients ate together in a dining room.<sup>42</sup>

#### *Sufficient time to eat*

Nurses and volunteers both reported that assistance for a suitable time frame would encourage dietary intake.<sup>40</sup> Seven studies<sup>10,14,20,32,33,40,42</sup> reported on the issue of time. When volunteer mealtime assistance programs have been set-up the majority of volunteers (76-93%)<sup>20,40</sup> felt they had enough time to adequately assist patients and the majority of patients (70%) themselves<sup>42</sup> indicated that they were given enough time with their meals. The average time spent by volunteers assisting patients ranged from 12.3 minutes<sup>40</sup> to 47.8 minutes<sup>14</sup> In an observational study of mealtimes nursing assistants spent an average of 85 minutes per day on eating assistance and total of 123 minutes

assistance time was provided by all other nursing staff. Nursing assistants reported that the time needed for assisting totally dependent patients was nearly four times longer than for the partially dependent patients: A distinction was observed between patients who were able to feed themselves but required some assistance (partial dependence) and those who were unable to self-feed and had to feed themselves (total dependence) The time needed for assisting totally dependent patients was nearly four times longer than for the partially dependent patients.

One study reported that patients took at average of 22.2 minutes to eat their meals with a range of 3 to 55 minutes. Although many patients finish eating by the time of tray collection, this did not always mean that they had completed all of their meal. One before and study<sup>32</sup> found that after the implementation of protected mealtimes that the number of minutes provided to eat the meal between delivery and collection significantly improved,  $p=0.000$ . The same study also showed that the median time until first assistance was received in those that required it at dinner significantly improved by approximately 4 min after intervention,  $p=0.008$ .

### **Barriers for providing feeding assistance**

Patients reported that nurses are not always available during mealtimes to provide assistance<sup>10,40,42</sup> and nurses reported that this is due to lack of time<sup>20,40,42</sup> and staff resources.<sup>20,42</sup> Nurses in the study by Walton et al.<sup>42</sup> reported concerns over the influence of the current level of staffing in allowing patients to be identified as needing assistance with meals, with 11% stating that 'there was not enough time'. When asked if there was enough time to assist patients in a timely manner, 25% felt that there 'wasn't adequate' time. However, in a nationwide survey of current practices with regard to food service provision in Australia almost all nurses who responded (98.5%) felt that they had adequate time to assist and feed patients who required it<sup>33</sup> with an average of 40 minutes available for each main meal. In contradiction to this findings from a single site case study in Australia revealed that 93% of nurses felt that they did not always have enough time to provide the feeding assistance. The findings from one observational study found that breakfast was the busiest time in the day for staff as this meal had the highest percentage of patients who needed assistance compared with lunch and dinner.<sup>10</sup> The same study also found that although there was usually help from relatives, the evening mealtime was very difficult as there was a smaller number of nursing staff with a higher percentage of totally dependent patients (15%).<sup>10</sup>

### *Negative Interruptions at mealtimes*

Four studies<sup>32,34,40,42</sup> reported various interruptions which were considered to be negative influences at mealtimes on dietary intakes. Negative influences included medication or medical rounds<sup>40,42</sup> or X-ray being scheduled at mealtimes<sup>42</sup>. Manning et al.<sup>40</sup> observed that there were a total of 53 observed medication and medical round interruptions during mealtimes. Interruptions often meant that meals would go cold as one study demonstrated that it took patients significantly longer to start to eat breakfast than lunch or tea,  $p=0.040$ , the authors suggest that this was because the patients were in the shower or because of a medication round.<sup>42</sup>

Two studies investigated the implementation of protected mealtimes and looked to see if the number of interruptions could be reduced.<sup>32,34</sup> There were no significant reductions ( $p=0.18$ ) in the occurrence of mealtime interruptions for one study<sup>34</sup> and the other study<sup>32</sup> found that the number of interruptions significantly increased during lunch( $p=0.000$ ), with interruptions by nursing staff significantly increasing by 8% ( $p<0.001$ ), representing 61% of all interruptions.

### **Facilitators for providing feeding assistance**

Dietitians, food service managers and nurse unit staff listed the main priorities for adequate hospital nutrition and included additional nursing and non-nursing staff available to help with feeding and set up for meals.<sup>33</sup> When protected mealtimes and or an additional assistant in nursing was employed to help feed patients then a significant reduction in non-clinical nursing tasks at mealtimes for all interventions was reported, thereby redirecting the focus towards prioritizing mealtimes.<sup>34</sup>

The number of patients requiring assistance varies greatly across studies depending on the specific population of patients on the wards at any one time. The results of a nationwide survey of food service provision in Australian hospital identified that on average 42% of patients required mealtime assistance.<sup>33</sup> Whereas results from a single centre study identified that by Walton et al.<sup>42</sup> noted that while only 22% of the patients felt that they needed assistance with eating 44% of the patients said they needed assistance to open food and beverage packaging.<sup>42</sup> A distinction was observed between

patients who were able to feed themselves but required some assistance (partial dependence) and those who were unable to self-feed (total dependence) in the observational study by Tsang.<sup>10</sup> Twenty three patients (50%) required partial assistance at meals and of those 20 (87%) actually received help that they needed from ward staff. Nine (20%) patients required full assistance for eating at mealtimes, six (76%) of these patients received assistance ranging from tray set-up to total feeding.

While assistance by nurses or trained volunteers was observed or reported across studies, it was apparent that more was actually required with some studies reporting the involvement of the food service assistants,<sup>33,42</sup> researchers,<sup>42</sup> visitors<sup>10,33,40,42</sup> and in some cases other patients.<sup>42</sup> In Manning et al.<sup>40</sup> there were 38 instances of visitors providing feeding assistance. These visitors spent similar amounts of time as the volunteers assisting patients. Food service managers, dietitians and nurse unit managers were all in agreement that the setting up of patients to access their meals and assisting those unable to feed themselves is primarily the responsibility of nurses.<sup>33</sup>

### *Protected mealtimes*

Two studies reported<sup>32,34</sup> that after the implementation of protected mealtimes significantly more patients received help with feeding during mealtimes. The study by Huxtable and Palmer<sup>32</sup> identified that all patients who required assistance were able to receive it regardless of whether protected mealtimes had been introduced. Assistance, however, included a variety of elements. Whilst there were no significant differences in the number of patients who needed assistance with set up (help with cutlery or meal cut up or being encouraged to eat), there was a significant increase in specific relation to help with feeding after the implementation of protected mealtimes,  $p < 0.05$ . They reported that the proportion of inpatients receiving feeding assistance when required nearly doubled after the implementation of protected mealtimes,  $p = 0.002$ . As well as implemented protected mealtimes patients in the study by Young et al.<sup>34</sup> also received assistance from an assistant in nursing or combined or protected mealtimes and help from the assistant in nursing. Prior to these interventions only 30% of patients received assistance with meals and with the introduction of protected mealtimes this rose to 80%, with the introduction of the assistant in nursing this rose to 79% and when both interventions took place simultaneously this rose to 76% all representing a significant increase compared to pre intervention levels,  $p < 0.01$ .

### **Experiences of volunteers**

This was addressed in two studies.<sup>40,41</sup> Manning et al.<sup>40</sup> reported that the only problem noted with the volunteer programme was when the volunteers were not informed which patients to feed. Twenty-two (76%) of the trained volunteers delivered mealtime assistance one day each week, seven (24%) volunteered on two days. Over the year, the volunteers assisted on 229 weekday lunchtimes: feeding, encouraging and assisting, preparing tables and cleaning hands before lunch. 3911 (76%) patients on the ward received assistance over the year. There were no adverse events associated with feeding patients. Mean duration of mealtime assistance by volunteers was 5.5 months (range 1–11 months); seven (24%) volunteers assisted for at least 10 months.

### *Retaining and supporting volunteers*

This was addressed in one study.<sup>41</sup> The volunteers received ongoing support from the hospital voluntary services team over the year as per usual practice. In addition, a member of the research team attended the ward each lunchtime; help was mainly required if the patient coughed or needed further swallow assessment. Eighteen volunteers (62%) required little input, were confident in their role and able to support less experienced mealtime assistants. Eight (28%) were less confident, needed supervision and guidance on occasion and help with completing paperwork. Importantly, only three volunteers (10%) needed guidance with assessing patients' needs and to be reminded not to help patients beyond their role as a mealtime assistant. The provision of ongoing support was determined by the needs of individual volunteers and was not related to duration of experience as a mealtime assistant. Twelve (41%) volunteers left the study for a variety of reasons.

### **Summary of narrative synthesis of quantitative data**

The evidence reported that barriers to eating for older patients (>65 years) from the perspective of patients, volunteers and nursing staff in hospital settings and rehabilitation units were: opening food and beverage packaging, inappropriate tray and/or patient position at meals, presentation of the

meals, choice of food, lack of time (two studies - Level 3e).<sup>40,42</sup> For older patients (>65 years) in rehabilitation units, eating on the ward as opposed to in a dining room was seen as a barrier to eating (one study – level 3e).<sup>42</sup> Nurses also identified that potential barriers to food intake for older patients (>65 years) included the clinical condition of the patient and if patients' were unwell or had a poor appetite (two studies - level 3e).<sup>40,42</sup>

Assistance by food service staff as part of a protected mealtime initiative to set up trays and ensuring that older patients' (> 65 years) had their meals within reach were shown to be important strategies in improving the amount of nutrient dense food and drink consumed (one study - level 2d).<sup>32</sup> Volunteers and nurses considered that volunteers performing tasks for older patients (> 65 years) other than physical feeding could facilitate dietary intake for example assistance with ordering and meal choices, setting up the tray, having meals within reach, assistance with opening packaging, encouragement, company, social interaction for both for older patients (> 65 years) in hospital (four studies – level 4)<sup>10,14,20,41</sup> and rehabilitation units (one study - level 3).<sup>42</sup> In rehabilitation units when volunteers or trained staff were not available these activities were also observed to be carried out by dietitians (one study – level 4b),<sup>42</sup> nutrition assistants (one study – level 4b),<sup>42</sup> other patients (one study – level 4b),<sup>42</sup> visitors (four studies – level 4b)<sup>10,33,40,42</sup> and food service assistants (one study – level 4b)<sup>33</sup> for patients in hospital settings.

Nurses observed that older patients (> 65 years) had improved intakes when patients in rehabilitation units ate together in a dining room (one study – level 4b).<sup>42</sup>

Working with food service staff as part of a protected mealtimes initiative improved the amount of time between delivery and collection of trays thereby giving older patients (>65 years) more time to eat (one study - level 2d).<sup>32</sup> Nurses and volunteers reported that allowing patients adequate time to eat could encourage dietary intake (one study – level 3d).<sup>40</sup>

There was a reduction in non-clinical nursing tasks at mealtimes when establishing protected mealtimes and/or also employing an additional assistant in nursing to help feed older patients (>65 years) (one study – level 2d).<sup>34</sup> Food service managers, dietitians and nurse unit managers were all in agreement that the setting up of older patients (> 65 years) to access their meals and assisting those unable to feed themselves is primarily the responsibility of nurses (one study – level 4b).<sup>33</sup> However, patients in hospital (one study – level 3e)<sup>10</sup> and (one study level 4b)<sup>40</sup> and rehabilitation settings (one study – level 4b)<sup>42</sup> reported that nurses were not always available during mealtimes to provide assistance. Nurses reported that this is due to lack of time (three studies (two studies – level 3e<sup>20,40</sup> and one study level 4b)<sup>42</sup>) and staff resources (two studies (one study level 3e)<sup>20</sup> and (one study – level 4b)<sup>42</sup>). Some nurses however, felt that they had adequate time to assist and feed patients who required it (one study – level 4b).<sup>33</sup>

Negative mealtime interruptions during mealtimes included medication or medical rounds (one study – level 3e) (one study level 4b).<sup>40</sup> The occurrence of mealtime interruptions was not reduced after the introduction of protected mealtimes in hospital settings (one study – level 2d)<sup>34</sup> and in one study was responsible for the number of interruptions increasing. (one study – level 2d).<sup>32</sup> More older patients were able to receive help with physical feeding during mealtimes after implementing protected mealtimes initiatives (including employing volunteers or assistants in nursing to physically feed patients) (two studies– level 2d).<sup>32, 34</sup> Dietitians, food service managers and nurse unit staff considered additional nursing and non-nursing staff available to help with feeding and set up for meals as one of the priorities for adequate hospital nutrition (one study – level 4b).<sup>33</sup>

The vast majority of volunteers and employed feeding assistants received training in order to assist with mealtimes in hospital settings. The only problem noted with volunteer programmes was when the volunteers were not informed which patients to feed (one study – level 3d).<sup>40</sup> Volunteers received support from each other and those who were less confident had additional support provided (one study – level 4c).<sup>41</sup>

## Mixed methods synthesis

For the translation of effectiveness data into thematic representations for the purpose of mixed method synthesis the summary of the effectiveness data as presented narratively were extracted and four synthesized findings generated (see table 12)

**Table 12: Textual synthesis of effectiveness data**

<b>Systematic review findings (effectiveness data)</b>	<b>Synthesized findings</b>
<p>Daily energy intake was significantly increased in older patients (&gt;65 years) in hospital settings when trained volunteers (Level 2c)<sup>15</sup> were present to provide mealtime support</p> <p>Lunch time energy intake was significantly increased in older patients (&gt;65 years) in hospital settings when trained volunteers were present to provide mealtime support (Level 4b)<sup>40</sup></p> <p>Breakfast protein intake was significantly increased when trained volunteers were present to provide mealtime support for older patients (&gt; 65 years) (Level 2d)<sup>32</sup></p> <p>Lunch time protein intake was significantly increased when trained volunteers were present to provide mealtime support for older patients (&gt; 65 years) (Level 3d)<sup>20,40</sup></p> <p>Daily protein intake was significantly increased when trained volunteers were present to provide mealtime support older patients (&gt; 65 years) (Level 3d)<sup>20,40</sup></p>	<p>Lunch time and daily energy intake, breakfast, lunch time and daily protein intake can be increased in older patients (&gt;65 years) in hospital settings when trained volunteers are present to provide support</p>
<p>Daily energy intake was significantly increased in older patients (&gt;65 years) in hospital settings when employed assistants (Level 1c)<sup>31</sup> were present to provide mealtime support</p> <p>A significant improvement in nutritional status for older patients (&gt;65 years) in hospital settings was seen when employed assistants (Level 1c)<sup>31</sup> were present to provide mealtime support</p> <p>A significant improvement in mortality four months post discharge for older patients (&gt;65 years) in an acute trauma unit when employed assistants (Level 1c)<sup>31</sup> were present to provide mealtime support was demonstrated</p>	<p>Daily energy intake, nutritional status, mortality four months post discharge can be increased in older patients (&gt;65 years) in hospital settings when employed assistants are present to provide support</p>
<p>Lunch time energy intake was significantly increased in older patients (&gt;65 years) in hospital settings when patients ate in a supervised dining room (Level 2c)<sup>18</sup> compared to others who ate in their bed area</p>	<p>Lunch time energy intake can be increased in older patients (&gt;65 years) in hospital settings when they eat their meals in a supervised dining room compared to others who ate in their bed area</p>
<p>When older patients in hospital settings (&gt;65 years) ate in a communal dining room there was a positive link between the nature and type of social exchanges and the duration of time older patients' (&gt;65 years) were in the dining room and older patients' (&gt;65 years) protein intake (Level 3e)<sup>29,30</sup></p>	<p>Eating in a communal dining room in hospital settings is associated with better protein intake for older patients (&gt;65 years)</p>



For the translation of quantitative descriptive data (non-effectiveness data) into thematic representations for the purpose of mixed method synthesis the summary of the quantitative descriptive data as presented narratively were extracted and eight synthesized findings generated (see table 13).

**Table 13: Textual synthesis of descriptive quantitative data**

Systematic review findings (quantitative data)	Synthesized findings
<p>Barriers to eating from the perspective of older patients (&gt;65 years), volunteers and nursing staff in hospital settings were: opening food and beverage packaging, inappropriate tray and/or patient position at meals, presentation of the meals, choice of food, lack of time (two studies - Level 3e)<sup>40,42</sup></p> <p>Volunteers and nurses considered that volunteers performing tasks other than physical feeding could facilitate dietary intake for example assistance with ordering and meal choices, setting up the tray, having meals within reach, assistance with opening packaging, encouragement, company, social interaction for both for older patients (&gt;65 years) in hospital (four studies – level 4)<sup>10,14,20,41</sup> and rehabilitation units (one study - level 3)<sup>42</sup></p> <p>In rehabilitation units when volunteers or trained staff were not available these activities were also observed to be carried out by dietitians (one study – level 4b)<sup>42</sup>, nutrition assistants (one study – level 4b)<sup>42</sup>, visitors (one study – level 4b)<sup>42</sup> and other patients (one study – level 4b)<sup>42</sup>. In hospital settings these were provided by visitors ( three studies – level 4b)<sup>10,33,40</sup> food service assistants (one study – level 4b)<sup>33</sup>, for older patients (&gt;65 years) in hospital settings</p> <p>More older patients (&gt;65 years) were able to receive help with physical feeding during mealtimes after implementing protected mealtimes initiatives (including employing volunteers or assistants in nursing to physically feed patients) (two studies– level 2d)<sup>32, 34</sup></p> <p>Dietitians, food service managers and nurse unit staff considered additional nursing and non-nursing staff available to help with feeding and set up for meals as one of the priorities for adequate hospital nutrition (one study – level 4b)<sup>33</sup> for older patients (&gt;65 years) in hospital settings</p>	<p>A variety of assistive and supportive strategies for example meal time set-up, opening packages or physical feeding can improve food intake for older patients (&gt;65 years), these can be delivered by volunteers, nurses, dietitians, visitors, and nutrition and food service assistants</p>
<p>Nurses also identified that potential barriers to food intake for older patients (&gt;65 years) included the clinical condition of the patient and if patients' were unwell or had a poor appetite (two studies - level 3e)<sup>40,42</sup></p>	<p>Nurses were aware that clinical condition can have a negative impact on both appetite and food intake for older patients (&gt;65 years)</p>

<p>Nurses and volunteers reported that allowing older patients (&gt;65 years) adequate time to eat could encourage dietary intake (one study – level 3d)<sup>40</sup></p> <p>Assistance by food service staff as part of a protected mealtime initiative to set up trays and ensuring that older patients (&gt;65 years) had their meals within reach were shown to be important strategies in improving the amount of nutrient dense food and drink consumed (one study - level 2d)<sup>32</sup></p> <p>Working with food service staff as part of a protected mealtimes initiative improved the amount of time between delivery and collection of trays thereby giving older patients (&gt;65 years) more time to eat (one study - level 2d)<sup>32</sup></p>	<p>Initiatives that focus on allowing older patients (&gt;65 years) sufficient time to eat are important as dietary intake can be encouraged</p>
<p>Nurses observed that older patients (&gt;65 years) had improved intakes when patients in rehabilitation units ate together in a communal dining room (one study – level 4b)<sup>42</sup></p> <p>For older patients (&gt;65 years) in rehabilitation units, eating on the ward as opposed to in a communal dining room was seen as a barrier to eating (one study – level 3e)<sup>42</sup></p>	<p>Eating in a <b>communal dining room</b> can improve food intake for older patients (&gt;65 years) in rehabilitation units</p>
<p>Food service managers, dietitians and nurse unit managers were all in agreement that the setting up of older patients (&gt;65 years) to access their meals and assisting those unable to feed themselves is primarily the responsibility of nurses (one study – level 4b)<sup>33</sup></p> <p>Some nurses however, felt that they had adequate time to assist and feed older patients (&gt;65 years) who required it (one study – level 4b)<sup>33</sup></p> <p>However, older patients (&gt;65 years) in hospital settings (one study – level 3e)<sup>10</sup> (one study level 4b)<sup>40</sup> and in rehabilitation units (one study – level 4b)<sup>42</sup> reported that nurses were not always available during mealtimes to provide assistance</p> <p>Nurses report that this is due to lack of time (two studies – level 3e)<sup>20,40</sup> (one study level 4b)<sup>42</sup> and staff resources (one study level 3e)<sup>20</sup> (one study – level 4b)<sup>42</sup></p>	<p>Nurses are not always available to help older patients (&gt;65 years) at mealtimes for a variety of reasons</p>
<p>There was a reduction in non-clinical nursing tasks at mealtimes when establishing protected mealtimes and/or also employing an additional assistant in nursing to help feed older patients (&gt;65 years) (one study – level 2d)<sup>34</sup></p> <p>The occurrence of mealtime interruptions was</p>	<p>Non-clinical tasks at mealtimes can be reduced, but the number of interruptions can be increased when protected mealtimes initiatives</p>

not reduced after the introduction of protected mealtimes in hospital settings (one study – level 2d) <sup>34</sup> In one study the number of interruptions increased after the introduction of protected mealtimes (one study – level 2d) <sup>32</sup>	are implemented to help feed older patients (> 65 years)
The only problem noted with volunteer programmes was when the volunteers were not informed which older patients (>65 years) to feed (one study – level 3d) <sup>40</sup>	Communication between nursing staff and volunteers is important
Volunteers received support from each other and those who were less confident had additional support provided (one study – level 4c) <sup>41</sup>	Volunteers benefit from support

## Description of synthesized findings

### *Textual synthesis of effectiveness data*

- TSE1: Lunch time and daily energy intake, breakfast, lunch time and daily protein intake can be increased in older patients (>65 years) in hospital settings when trained volunteers are present to provide support .
- TSE2: Daily energy intake, nutritional status, mortality four months post discharge can be increased in older patients (>65 years) in hospital settings when employed assistants are present to provide support.
- TSE3 Lunch time energy intake can be increased in older patients (>65 years) in hospital settings when they eat their meals in a supervised dining room as opposed to on the ward.
- TSE4: Eating in a communal dining room in hospital settings is associated with better protein intake for older patients (>65 years).

### *Meta synthesis of qualitative data*

- Q1: Competing priorities and interruptions related to ward activities had a negative impact at mealtimes for older patients (>65 years).
- Q2: Assistance at mealtimes for older patients (> 65 years) from staff, relatives and volunteers is positive and helpful.
- Q3: Providing assistance to older patients (>65 years) at mealtimes can be challenging.

### *Textual descriptive synthesis of quantitative data*

- TD1: A variety of assistive and supportive strategies for example meal time set-up, opening packages or physical feeding can improve food intake for older patients (>65 years), these can be delivered by volunteers, nurses, dietitians, visitors, and nutrition and food service assistants.
- TD2: Nurses were aware that clinical condition of older patients (>65 years) can have a negative impact on both appetite and food intake.
- TD3: Initiatives that focus on allowing older patients (>65 years) sufficient time to eat are important as dietary intake can be encouraged.
- TD4: Eating in a communal dining room can improve food intake for older patients (>65 years) in rehabilitation units.
- TD5: Nurses are not always available to help older patients (>65 years) at mealtimes for a variety of reasons.
- TD6: Non-clinical tasks at mealtimes can be reduced, but the number of interruptions can be increased when protected mealtimes initiatives are implemented to help feed older patients (> 65 years).
- TD7: Communication between nursing staff and volunteers is important.

- TD8: Volunteers benefit from support.

The four individual syntheses for the effectiveness data (objective 1), the three individual syntheses from the qualitative component (objective 2) and the eight individual textual descriptive syntheses from the quantitative component (objective 2) were aggregated to provide a number of mixed methods syntheses to answer the research question “What goes on, what works and what do patients, families and healthcare professionals think about it?”

Recommendations were developed for each aggregated synthesis and are presented under implications for practice (page 37). Grades of recommendation were assigned to each recommendation in accordance with the Joanna Briggs Institute (2014) Grades of Recommendation FAME scale (feasibility, appropriateness, meaningfulness, and effectiveness).<sup>44</sup> These are informed by the GRADE working party to promote ease of interpretation by both clinicians and patients.

### **Aggregated mixed methods synthesis 1: What goes on?**

One synthesis from the qualitative data and four individual textual descriptive syntheses from quantitative data formed this aggregated mixed methods synthesis.

Included syntheses: Q1, TD2, TD3, TD5 and TD6

Some older patients (>65 years) need assistance at mealtimes, especially those who are unwell or who have a poor appetite. The evidence shows that nurses are not always available to help older patients (>65 years) at mealtimes for a variety of reasons which include competing priorities and interruptions related to ward activities. Initiatives that focus on allowing older patients (>65 years) sufficient time to eat are important. Non-clinical tasks at mealtimes can be reduced, but the number of interruptions can be increased when protected mealtimes initiatives are implemented

Mealtimes should be viewed as high priority, all healthcare staff should limit other activities during mealtimes and allow older patients (>65 years) to eat uninterrupted, providing support where required so that dietary intake can be encouraged

### **Aggregated mixed methods synthesis 2: What works?**

One synthesis from the qualitative data, two individual textual descriptive syntheses from quantitative data and four effectiveness data formed two aggregated mixed methods synthesis.

2a. Included syntheses: Q2, TD1, TSE1 and TSE2

The use of a variety of assistive and supportive mealtime strategies delivered by volunteers, nurses, dietitians, relatives/visitors, and nutrition and food service assistants is effective and helpful in increasing food intake for older patients (>65 years) in both hospital and rehabilitation units. The use of volunteers was effective in increasing energy and protein intake for older patients (>65 years) in hospital settings. The use of employed assistants has been shown to be effective in increasing energy intake, nutritional status, mortality (four months post discharge) for older patients (>65 years) in hospital settings.

Nursing staff, employed mealtime assistants, volunteers or relatives/visitors can help prepare the older patient (>65 years) for meals in a number of ways, which can range from opening packages and cutting up food as well as physically feeding the patient; this would have an impact on a range of clinical outcomes

2b. Included syntheses: TD4, TSE3 and TSE4

Eating in a dining room was effective in increasing energy and protein intake for older patients (>65 years) in hospital settings and improves food intake for older patients (>65 years) in rehabilitation units.

Social interaction at mealtimes, including eating in a dining room for older patients (>65 years) in hospital settings and rehabilitation units, is effective in increasing food intake, energy and protein intake and could be encouraged

### **Aggregated mixed methods synthesis 3: What do patients, families and healthcare professionals think about it?**

One synthesis from the qualitative data and two individual textual descriptive syntheses from quantitative data formed this aggregated mixed methods synthesis.

Included syntheses: Q3, TD7 and TD8

Providing assistance at mealtimes to older patients (>65 years) can be challenging. Volunteers benefit from training and support. It was identified that there was a lack of clarity around responsibility for feeding support. Communication and knowledge of nutrition care processes between disciplines and with volunteers was poor.

Training and ongoing support for volunteers is needed and communication between all members of the multi-disciplinary team and between staff and volunteers is important

## **Discussion**

### **What goes on?**

It is well recognized that older people often need some form of mealtime assistance to enable them to meet their nutritional requirements in hospital.<sup>7,8,17,45,46</sup> A British Association for Parental and Enteral Nutrition (BAPEN) report recommended that a flexible and compassionate approach must be taken to the delivery of nutritional care which should include patients, carers and other advocates.<sup>47</sup> This review established that nurses are not always available to help patients at mealtimes for a variety of reasons, which include competing priorities and interruptions related to ward activities, such as administering drugs and completing paperwork. When mealtimes are not made high priority then nutritional intake suffers. Optimal nutrition is important to support recovery, which can subsequently reduce the length of hospital stays resulting in cost savings to health service providers and a reduction in the human suffering associated with malnutrition.<sup>47</sup> Prioritizing mealtime support is essential if adequate assistance and encouragement is to be provided to older patients (>65 years). As well as providing practical support with the eating process, this review determined that sufficient protected time needs to be provided so that older patients (>65 years) have time to complete their meals. Such activities can only occur if healthcare staff limit other ward activities during mealtimes to reduce unnecessary interruptions. All of these recommendations can be accommodated within protected mealtime initiatives.<sup>7,8,17,45,46</sup>

It is evident from this review that protected mealtimes alone, however, cannot improve nutritional intake in older people in hospital. The adequacy of the protected mealtime implementations has previously been called into question for all hospitalized patients,<sup>8,24,46,48</sup> with practice varying widely,<sup>8</sup> and a large number of areas not adhering to protected mealtimes initiatives.<sup>48</sup> This review retrieved a number of papers that described such initiatives within hospital settings.<sup>49-56</sup> Only two studies of moderate quality were finally included in the review, these were not able to demonstrate any improvements in energy or protein intake for older hospitalized patients.<sup>32,34</sup> This concurs with findings from a previous review conducted across all hospitalized patients<sup>24</sup>. Protected mealtimes appear to be most beneficial when all healthcare staff work together to make nutritional intake a priority as demonstrated in one of the included studies which showed that assistance by food service staff, as part of a protected mealtime initiative, to set up trays and ensure that patients' had their meals within reach were important strategies in improving the amount of nutrient dense food and drink consumed.<sup>32</sup> There is a need for strategies to be put in place in hospital settings to ensure that protected mealtimes are successful as they have the potential to contribute towards preventing under-nutrition for older people during hospitalization.<sup>8,57</sup>

## What works?

When staff are able to prioritize mealtimes and provide feeding assistance this has a positive effect on both patients' and staff mealtime experience. This review has shown that a variety of assistive and supportive strategies delivered by dieticians and nutrition and food service assistants can increase food intake for older patients (>65 years). Evidence from one high quality study demonstrated that energy intake, nutritional status and mortality four months post discharge can be increased for older patients (>65 years) in hospital settings, who had undergone surgery for a hip fracture, when dietetic assistants were available to give support. The role of the dietetic assistants was to assure that older patients (>65 years) allocated to them received appropriate help in meeting their nutritional needs and they were available for six hours each day, for seven days a week.<sup>31</sup> However, evidence from another high quality study where employed healthcare assistants who were supernumerary to the usual staffing levels and who worked five days a week and covered two meals, did not show any effect on older patients' clinical outcomes. The number of older patients (>65 years) in this study was low and the authors suggest that this could be one of the reasons why no differences were found, along with the fact that other staff may have been more helpful to the older patients (>65 years) in the control group thereby contaminating the results.<sup>18</sup> The majority of previous reviews across a range of institutions and age groups<sup>21,22,24</sup> did not find any additional studies for the use of employed assistants. However, it is important that the nutritional needs of older patients (>65 years) in hospital settings and rehabilitation units are met.<sup>7,8</sup> The studies identified and reviewed suggest there can be improvement in clinical outcomes when staff and employed assistants are encouraged to provide support at mealtimes to support older patients (>65 years) in hospital settings and rehabilitation units.

It has been recommended that hospitals should use trained volunteers where appropriate to assist patients at mealtimes,<sup>7,8,55</sup> and that this can relieve some of the pressure on ward staff and can improve the effectiveness of other initiatives, for example protected mealtimes and the red tray system.<sup>8</sup> A range of evidence from moderate to very low quality within this review has shown that lunch time and daily energy intake, breakfast, lunch time and daily protein intake can be increased in older patients (>65 years) in hospital settings when trained volunteers are present to provide support for older patients (>65 years) in hospital settings. This review ascertained that using volunteers to deliver a variety of assistive and supportive strategies for example meal time set-up, opening packages or physical feeding can improve food intake for older patients (>65 years) in both hospital settings and rehabilitation units and working with volunteers to provide mealtime support should be encouraged.

As well as receiving support from employed assistants or volunteers a number of reports have suggested that family, family members or visitors can offer assistance to older patients (>65 years) at mealtimes.<sup>8,51,57,61</sup> This is encouraged as part of protected mealtimes across a number of hospitals. This review found that relatives support at mealtimes for older patients (>65 years) is positive and valued as they can help prepare the older patient for meals in a number of ways, which can range from opening packages and cutting up food as well as physically feeding the patient. Encouraging relatives/visitors to help with providing assistance for older patients (>65 years) could be beneficial as this would allow staff to have more time for other tasks. Additionally the findings acknowledged that learning strategies from the family could improve individual nutritional intake and ward staff should be encouraged to discuss these strategies with family members where appropriate.

Implementing a system where older patients (>65 years) who are assessed as being at risk of malnutrition, and need help to eat and drink in hospital settings and rehabilitation units, are identified as important and the use of a 'red tray' system has been encouraged.<sup>8,57,58</sup> Across the literature a number of different systems have been implemented for the older patient and these include for example a coloured tray red tray<sup>16,51-53,59</sup> red dot above the bed,<sup>60</sup> red napkins as tray liners,<sup>56</sup> yellow napkins,<sup>59</sup> traffic lights,<sup>53</sup> or red jug.<sup>52</sup> This review however, did not find any papers that investigated the effectiveness of such initiatives.

As well as providing older patients (>65 years) with adequate nutrition, mealtimes are also an opportunity to encourage supportive social interaction amongst patients.<sup>17</sup> All older patients (>65 years) should have the option of being able decide where they eat their meals and whether or not to sit at a table.<sup>44</sup> Giving older patients (>65 years) opportunities to consume meals in a communal dining room has the potential to increase food intake as well as providing a social environment for eating.<sup>55</sup> This review has shown that when older patients (>65 years) in both hospital settings and rehabilitation units ate in a dining room, food intake, energy and protein intake was increased and that

social interaction associated with mealtimes was also important. Evidence from one moderate quality study has demonstrated that lunch time energy intake can be increased in older patients (>65 years) in hospital settings when they eat their meals in a supervised dining room compared to others who ate in their bed area however, there was no improvement with regard to protein intake. The numbers of patients taking part in this study were small which could account for this finding. Further evidence from one low quality study showed that eating in a communal dining in a hospital setting was associated with better protein intake.

### **What do patients, families and healthcare professionals think about it?**

The review identified that volunteers felt that providing mealtime assistance to older patients (>65 years) could be challenging, particularly if the patients didn't want to eat, or if they were not informed which patients required assistance. However, this review identified that training and ongoing support from other volunteers and healthcare staff was beneficial and such training and support mechanisms could be provided to all volunteers as part of volunteer mealtime assistance programmes. This is an area that the Hungry to be Heard campaigns<sup>7,8</sup> recognize as important after responding to the evidence that many older people were malnourished in hospital. This review also found that staff, patients and relatives/visitors recognize that providing assistance at mealtimes can be challenging.

A recent scoping review found that although nurses recognize the importance of nutritional care and acknowledge it as part of their role that a number of challenges exist with studies consistently finding: lack of knowledge, lack of clarity of their role in nutritional care and lack of confidence in the effectiveness of nutritional care interventions.<sup>62</sup> Further findings from the review found that staff identified that there was a lack of clarity around responsibility for feeding support. In particular communication and knowledge of nutrition care processes between disciplines was poor and staff felt that these factors acted as potential barriers to nutritional care of elderly patients. In order to address these issues all members of the multi-disciplinary team need to be aware of nutrition care processes and ensure that older patients' (>65 years) nutritional needs are identified and addressed as part of individual care plans.<sup>47</sup> These plans should provide role clarity and identify individual responsibilities for meeting the nutritional needs of each older patient and this could be clearly communicated to volunteers by ward staff. Age UK, as part of the Hungry to be Heard campaigns<sup>7,8</sup> recommend that all staff must become aware by understanding that every meal is important.

### **Limitations**

The studies included in this review varied in methodological quality, which impacts on the overall results and conclusions that can be drawn. Only two RCTs were included with the majority of the quantitative studies being low quality level three studies using observational methods. Where observational methods alone are used patients and nurses may alter their behaviour from usual and where limited observers are available data could have been missed. The variety of intervention and outcome measures was too diverse to undertake a meta-analysis. The qualitative data provided in the two mixed methods studies was of low quality. The majority of the patients included in the studies were female and all the included studies were carried out in westernized countries, therefore applicability to other genders and populations is limited. Characteristics of volunteers were generally not identified. Manning et al<sup>40</sup> commented that in hospital settings it is not possible to control all variables. Naithani et al<sup>36</sup> also commented that patients who are ill to consent to participate are often those at the greatest risk of undernutrition.

### **Conclusions**

The findings from this mixed methods systematic review sought to establish the effectiveness of mealtime initiatives for improving nutritional intake and nutritional status for older adult patients in hospital settings and rehabilitation units. It also provides an understanding both of the perceptions and experiences of older adult patients and those involved with their care regarding the provision of adequate mealtime support in hospital settings and rehabilitation units. Effectiveness data concluded that the use of volunteers had a positive impact on energy and protein intake and employed assistants had a positive impact in increasing energy intake, nutritional status, mortality four months post discharge for older patients (>65 years) in hospital settings. The use of supervised dining rooms as opposed to eating in the bed area positively influenced energy intake and eating in a communal

dining room was associated with a better protein intake and was also effective in improving energy and protein intake in the hospital setting.

Qualitative data focused on the negative impact of ward related interruptions on mealtimes, the positive impact when staff prioritized mealtime support and the challenges faced by staff and volunteers related to supporting older patients (>65 years). Data from descriptive quantitative studies provided evidence relating to a range of mealtime support strategies. It was suggested that initiatives that focus on allowing older patients (>65 years) sufficient time to eat are important and that the condition of the patient and the time restraints nurses are subject to, impacts on their ability to provide mealtime support. There was limited evidence for the benefit of protected mealtimes.

A number of initiatives were identified which can be used to support older patients (>65 years) at mealtimes in hospital settings and rehabilitation units. No firm conclusions can be drawn in respect to the most effective initiatives. However, initiatives with merit include those that encourage social interaction either through the use of a dining room or employed staff or volunteers spending time with the older patient during mealtimes. Any initiative that involves supporting the older patients (>65 years) with ordering and meal choices, setting up the tray, having meals within reach, assistance with opening packaging is beneficial. These could be provided by nursing staff, employed assistants, volunteers, relatives or visitors. Whoever provides the support need to be aware that patients need to be allowed adequate time to eat. If nursing staff are to fulfil the role of mealtime assistance then mealtimes should be viewed as a high priority and all healthcare staff should limit other activities to allow patients to eat uninterrupted, providing support where required. Volunteers value training and support and clarification of their roles and responsibilities for supporting individual patients which would involve clear communication from nursing staff.

### **Implications for practice**

The aggregated mixed method syntheses of quantitative and qualitative data on assistance at mealtimes for older adults (>65 years) in hospital settings and rehabilitation units derived a set of recommendations that are useful for clinical practice and policy decision making.

From synthesis 1 we recommend that:

- Strategies could be put in place in hospital settings to ensure that protected mealtimes are successful. (Grade B)
- Ward staff should avoid interrupting older patients (> 65 years) whilst they are eating and prioritize assisting with food where this is required. (Grade A)
- Sufficient protected time should be made available to allow older patients (> 65 years) in hospital settings time to eat. (Grade A)
- Ward staff could spend time with older patients (> 65 years) who are unwell or have a poor appetite, to encourage sufficient food intake where appropriate to the patient's condition. (Grade B)

From synthesis 2a we recommend that:

- Staff and employed assistants should be encouraged to provide support at mealtimes to support older patients (>65 years) in hospital settings and rehabilitation units. (Grade A)
- Relatives/visitors should be encouraged to visit at mealtimes to support older patients (>65 years) in hospital settings and rehabilitation units. (Grade A)
- The use of volunteers to provide mealtime support for older patients (>65 years) in hospital settings and rehabilitation units should be encouraged. (Grade A)

From synthesis 2b we recommend that:

- Dining rooms could be used for mealtimes for older patients (>65 years) in hospital settings and rehabilitation units. (Grade B)

From synthesis 3 we recommend that:



- Volunteers could be trained and have support mechanisms in place. (Grade B)
- All members of the multi-disciplinary team need to be aware of nutrition care processes and ensure that older patients' (>65 years) nutritional needs are identified and addressed as part of individual care plans. These plans could provide role clarity and identify individual responsibilities for meeting the nutritional needs of each older patient which can then be clearly communicated to volunteer staff. (Grade B)

### **Implications for research**

With regard to the effectiveness component of this mixed methods systematic review, there were no studies conducted that investigated the effectiveness of the 'red tray' system for older patients (>65 years) in hospitals settings or rehabilitation units. Very few studies were located and included in this mixed methods systematic review that investigated the effectiveness of protected mealtimes. The two studies that were found were of moderate quality. There is only a small amount of high quality evidence to support the use of volunteers at mealtimes, employed assistants at mealtimes or providing mealtimes in a dining room. Further high quality research is required to determine the effectiveness of the 'red tray' system, protected mealtimes, volunteers at mealtimes, employed assistants and providing mealtimes in a dining room in hospital settings and rehabilitation units. Multicentre randomized trials could be conducted in these areas that focus on a range of clinical outcomes that are of importance to the patient and not just on energy and protein intake such as length of stay, nutritional status and mortality. The majority of quantitative research was conducted within hospital settings so there is scope for future primary research to be conducted within rehabilitation units.

With regard to the perceptions and experiences of older adult patients and those involved with their care with regard to assistance at mealtimes there was limited research conducted with the older adult patients themselves. It is important to know how patients feel about the variety of strategies employed to encourage physical feeding and assistance with mealtime set up. One of the recommendations of this mixed methods review is to encourage relatives/visitors to visit at mealtimes and to offer support to older patients (>65 years) in hospital settings and rehabilitation units. Although this has been suggested<sup>8,51,57,61</sup> and is actively encouraged as part of protected mealtimes across a number of hospitals this is not an area that has been the specific focus of primary research to date. There is an opportunity therefore, for future work to make a contribution to this area.

### **Conflicts of interest**

Jane Hopkinson is a member of the Scientific Board, Cachexia Hub, Helsinn Healthcare and the UK Cancer Anorexia-Cachexia Syndrome Steering Committee, Chugai Pharma, UK.

### **Acknowledgments**

None

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**Appendix 1: Search strategy**

Database(s): Ovid MEDLINE(R) and Ovid EMBASE

1. exp Hospitals/
2. hospital\$.ab,ti.
3. ward\$.ab,ti.
4. unit\$.ab,ti.
5. (healthcare adj1 setting\*).ab,ti.
6. (rehabilitation adj1 unit\*) ab,ti.
7. 1 or 2 or 3 or 4 or 5 or 6
8. exp Adult/
9. adult\$.ab,ti.
10. exp Patients/
11. patient\*.ab,ti.
12. 8 or 9 or 10 or 11
13. exp Meals/
14. meal\$.ab,ti.
15. feed\$.ab,ti.
16. food.ab,ti.
17. Exp Food/
18. lunch\$.ab,ti.
19. Exp Eating/
20. exp Food Assistance/
21. eat\$.ab,ti.
22. diet\$.ab,ti.
23. 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22
24. assist\$.ab,ti.
25. help\$.ab,ti.
26. Volunt\$.ab,ti.
27. Support\$.ab,ti.
28. 24 or 25 or 26 or 27
29. 7 and 12 and 23 and 28
30. limit 29 to english language
31. limit 30 to yr="1998 -Current"

## Database(s): Ovid Psychinfo

1. exp Hospitals/
2. hospital\$.ab,ti.
3. ward\$.ab,ti.
4. unit\$.ab,ti.
5. (healthcare adj1 setting\*).ab,ti.
6. (rehabilitation adj1 unit\*) ab,ti.
7. 1 or 2 or 3 or 4 or 5 or 6
8. adult\$.ab,ti.\$
9. exp Patients/
10. patient\*.ab,ti.
11. 8 or 9 or 10
12. exp Mealtimes/
13. meal\$.ab,ti.
14. feed\$.ab,ti.
15. food.ab,ti.
16. Exp Food/
17. lunch\$.ab,ti.
18. Exp Eating/
19. exp Food intake/
20. eat\$.ab,ti.
21. diet\$.ab,ti.
22. 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21
23. assist\$.ab,ti.
24. help\$.ab,ti.
25. Volunt\$.ab,ti.
26. Support\$.ab,ti.
27. 23 or 24 or 25 or 26
28. 7 and 11 and 22 and 27
29. limit 29 to english language
30. limit 30 to yr="1998 -Current"

**EBSCO host – Cinahl**

S13	S3 AND S6 AND S11 AND S12
S12	S7 OR S8 OR S9 OR S10
S11	S4 OR S5
S10	TI feed* OR AB feed*
S9	TI support* OR AB support*
S8	TI help* OR AB help*
S7	TI assist* OR AB assist*
S6	TI meal* or AB meal*
S5	(MH "Patients+")
S4	(MH "Adult+")
S3	S1 OR S2
S2	TI hospital* OR AB hospital*
S1	(MH "Hospitals+")

## Appendix II: MASTARI Appraisal instruments

### JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_ Record Number \_\_\_\_\_

	Yes	No	Unclear	Not Applicable
1. Was the assignment to treatment groups truly random?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were participants blinded to treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was allocation to treatment groups concealed from the allocator?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were those assessing outcomes blind to the treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were the control and treatment groups comparable at entry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were groups treated identically other than for the named interventions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in the same way for all groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal:      Include ☐      Exclude ☐      Seek further info. ☐

Comments (Including reason for exclusion)

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## JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_ Record Number \_\_\_\_\_

	Yes	No	Unclear	Not Applicable
1. Is sample representative of patients in the population as a whole?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are the patients at a similar point in the course of their condition/illness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Has bias been minimised in relation to selection of cases and of controls?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal:      Include ☐      Exclude ☐      Seek further info. ☐

Comments (Including reason for exclusion)

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## **JBI Critical Appraisal Checklist for Descriptive / Case Series**

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_ Record Number \_\_\_\_\_

	Yes	No	Unclear	Not Applicable
1. Was study based on a random or pseudo-random sample?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If comparisons are being made, was there sufficient descriptions of the groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal:      Include ☐      Exclude ☐      Seek further info ☐

Comments (Including reason for exclusion)

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### Appendix III: JBI-QARI appraisal instruments

#### JBI QARI Critical Appraisal Checklist for Interpretive & Critical Research

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_ Record Number \_\_\_\_\_

	Yes	No	Unclear	Not Applicable
1. Is there congruity between the stated philosophical perspective and the research methodology?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there congruity between the research methodology and the research question or objectives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Is there congruity between the research methodology and the methods used to collect data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is there congruity between the research methodology and the representation and analysis of data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is there congruity between the research methodology and the interpretation of results?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is there a statement locating the researcher culturally or theoretically?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the influence of the researcher on the research, and vice-versa, addressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Are participants, and their voices, adequately represented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: ☐ Include ☐ Exclude ☐ Seek further info. ☐

Comments (Including reason for exclusion)

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## Appendix IV: MASTARI data extraction instruments

### JBI Data Extraction Form for Experimental / Observational Studies

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_

Journal \_\_\_\_\_ Record Number \_\_\_\_\_

#### Study Method

RCT ☐ Quasi-RCT ☐ Longitudinal ☐

Retrospective ☐ Observational ☐ Other ☐

#### Participants

Setting \_\_\_\_\_

Population \_\_\_\_\_

#### Sample size

Group A \_\_\_\_\_ Group B \_\_\_\_\_

#### Interventions

Intervention A \_\_\_\_\_

Intervention B \_\_\_\_\_

Authors Conclusions:

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Reviewers Conclusions:

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**Study results****Dichotomous data**

Outcome	Intervention ( ) number / total number	Intervention ( ) number / total number

**Continuous data**

Outcome	Intervention ( ) number / total number	Intervention ( ) number / total number

## Appendix V: QARI data extraction instruments

### JBI QARI Data Extraction Form for Interpretive & Critical Research

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_

Journal \_\_\_\_\_ Record Number \_\_\_\_\_

#### Study Description

Methodology

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Method

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Phenomena of interest

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Setting

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Geographical

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Cultural

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Participants

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Data analysis

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Authors Conclusions

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Comments

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Complete

Yes ☐

No ☐

Findings	Illustration from Publication (page number)	Evidence		
		Unequivocal	Credible	Unsupported

Extraction of findings complete

Yes ☐No ☐

**Appendix VI: JBI-QARI credibility scale**

Unequivocal (U): evidence beyond reasonable doubt, which may include findings that are matter of fact, directly reported / observed and not open to challenge.

Credible (C): related to those findings that are, albeit interpretation, plausible in light of the data and theoretical framework. They can be logically inferred from the data. Because the findings are essentially interpretative they can be challenged.

Unsupported (Un): is when the findings are not supported by the data.



**Appendix VII: Screening Tool: Mealtime Support**

Reference ID \_\_\_\_\_ Author/s (year) \_\_\_\_\_ Country \_\_\_\_\_

Reviewer \_\_\_\_\_ Date Reviewed \_\_\_\_\_

	Yes	No	
<b>Older adults</b>	<input type="checkbox"/>	<input type="checkbox"/>	If no exclude
<b>Hospital Setting</b>	<input type="checkbox"/>	<input type="checkbox"/>	
OR			If both no exclude
<b>Rehabilitation Care Setting</b>	<input type="checkbox"/>	<input type="checkbox"/>	
<hr/>			
<b>Mealtime Assistance</b>	<input type="checkbox"/>	<input type="checkbox"/>	If no exclude
<b>Main focus of study</b>	<input type="checkbox"/>		
<b>Part of Wider study</b>	<input type="checkbox"/>		
<b>If Yes Specify</b>			
Protected Mealtimes	<input type="checkbox"/>	Volunteer Feeding Assistance	<input type="checkbox"/>
Nursing/ HCA Feeding Assistance	<input type="checkbox"/>	Coloured Tray	<input type="checkbox"/>
Dietetic Assistance	<input type="checkbox"/>	Communal Dining	<input type="checkbox"/>
Other	<input type="checkbox"/>		
Please specify	_____		
<hr/>			
<b>Primary Research</b>	<input type="checkbox"/>	<b>Education Article / CPD</b>	<input type="checkbox"/>
<b>Description of local initiative</b>	<input type="checkbox"/>	<b>Review Article</b>	<input type="checkbox"/>
<b>Discussion Article</b>	<input type="checkbox"/>	<b>Policy Document</b>	<input type="checkbox"/>
<b>Conference Abstract</b>	<input type="checkbox"/>	<b>Study Protocol / design</b>	<input type="checkbox"/>
<b>Study Report</b>	<input type="checkbox"/>		

**DECISION**In ☐Out ☐**NOTES**Not Sure ☐

**Appendix VIII: Studies excluded after reading full text papers**

Agarwal E, Ferguson M, Banks M, <a href="#">Bauer J</a> , <a href="#">Capra S</a> , <a href="#">Isenring E</a> . Nutrition care practices in hospital wards: results from the Nutrition Care Day Survey 2010. <i>Clin Nutr</i> . 2012; <b>31</b> :995-1001.	Study does not meet inclusion criteria of systematic review as all adult patients in acute care hospitals
Allison SP, Rawlings J, Field J, Bean N, Stephen AD. Nutrition in the elderly hospital patient Nottingham studies. <i>J Nutr Health Aging</i> . 2000; <b>4</b> :54-7.	Study does not meet inclusion criteria of systematic review as explored modified diets
Altus DE, Engelman KK, Mathews RM. Finding a practical method to increase engagement of residents on a dementia care unit. <i>Am J Alzheimer Dis Other Dement</i> 2002; <b>17</b> :245-8.	Study does not meet inclusion criteria of systematic review as was conducted in an assisted living facility
Altus DE, Engelman KK, Mathews RM. Using family-style meals to increase participation and communication in persons with dementia. <i>J Gerontological Nurs</i> . 2002; <b>28</b> :47-53.	Study does not meet inclusion criteria of systematic review as was conducted in an assisted living facility
Archibald C. Meeting the nutritional needs of patients with dementia in hospital. <i>Nurs Standard</i> . 2006; <b>20</b> :41-5.	Study does not meet inclusion criteria of systematic review as was concerned nutrition intake dementia patients
Aselage M. Measuring mealtime difficulties: eating, feeding and meal behaviours in older adults (>65 years) with dementia. <i>J Clin Nurs</i> . 2010; <b>19</b> :621-31.	Study does not meet inclusion criteria of systematic review as was explored assessing mealtime difficulties in dementia patients
Bachrach-Lindstrom M, Johansson T, Unosson M, Ek AC, Wahlstrom O. Nutritional status and functional capacity after femoral neck fractures: a prospective randomized one-year follow-up study. <i>Aging Clin Exp Res</i> . 2000; <b>12</b> :366-74	Study does not meet inclusion criteria of systematic review as intervention was protein enriched food and nutrition advice
Baltawar B. Meal priorities. <i>Nurs Times</i> . 1999; <b>95</b> :61-2.	Unavailable
Barrett R, Tuttle V, Whalen E, Gatchell C, Dawe A. Pressure ulcers and nutritional support: a partnership to improve patient outcomes. <i>J Nurs Care Qual</i> . 2010; <b>25</b> :145-50.	Not a study but a description of an evidence based practice project of nutrition support for patients with pressure ulcers
Barton AD, Beigg CL, Macdonald IA, Allison SP. High food wastage and low nutritional intakes in hospital patients. <i>Clin Nutr</i> . 2000; <b>19</b> :445-9.	Study does not meet inclusion criteria of systematic review as explored food provision and food wastage
Belgacem B, Auclair C, Fedor M, <a href="#">Brugnon D</a> , <a href="#">Blanquet M</a> , <a href="#">Tournilhac O</a> , et al. A caregiver educational program improves quality of life and burden for cancer patients and their caregivers: a randomised clinical trial. <i>Eur J Oncol Nurs</i> . 2013; <b>17</b> :670-6.	Study does not meet inclusion criteria of systematic review as patients younger than 65 years
Best C, Summers J. Strategies for nutritional care in acute settings. <i>Nurs Older People</i> . 2010; <b>22</b> :27-31.	Not a study; discussion paper of nutritional strategies
Bloomfield J, Pegram A. Improving nutrition and hydration in hospital: the nurse's responsibility. <i>Nurs</i>	Not a study; education/ continuous professional development article on

<i>Standard</i> . 2012; <b>26</b> :52-6.	nutrition and hydration in hospital
Boffelli S, Rozzini R, Trabucchi M. Nutritional intervention in special care units for dementia. <i>J Am Geriatr Soc</i> . 2004; <b>52</b> :1216-7.	Study does not meet inclusion criteria of systematic review as intervention was a nutritional program consisting of modifications to diet
Bradburn Y, Booth J, Gokal R. <a href="#">Hutchison A</a> , <a href="#">Marson H</a> , <a href="#">McErlain L</a> et al. A review of food provision to a renal ward and the proposed appointment of feeding assistants. <i>J Renal Nutr</i> . 1999; <b>9</b> :198-201.	Study does not meet inclusion criteria of systematic review as a review of review of food provision for all renal patients
Brogden BJ. Clinical skills: importance of nutrition for acutely ill hospital patients. <i>Br J Nurs</i> . 2004; <b>13</b> :914-20.	Not a study; discussion paper around providing good nutrition
Brown H, Jones L. The role of dining companions in supporting nursing care. <i>Nurs Standard</i> . 2009; <b>23</b> :40-6.	Not a study; description only of dining companions
Butler M, Collins R, Drennan J, <a href="#">Halligan P</a> , <a href="#">O'Mathúna DP</a> , <a href="#">Schultz TJ</a> et al. Hospital nurse staffing models and patient and staff-related outcomes. <i>CDSRs</i> . 2011(7):CD007019.	Not a study; systematic review relevant papers retrieved
Butler-Williams C, James J, Cox H, Hunt J. The hidden contribution of the health care assistant: a survey-based exploration of support to their role in caring for the acutely ill patient in the general ward setting. <i>J Nurs Manage</i> . 2010; <b>18</b> :789-95	Study does not meet inclusion criteria of systematic review as explored the role of health care assistants
Calkins M, Brush J. Designing for dining: the secret of happier mealtimes. <i>J Dement Care</i> . 2002; <b>10</b> :24-6.	Study does not meet inclusion criteria of systematic review as conducted in nursing home
Calverley D. The food fighters. <i>Nurs Standard</i> . 2007; <b>21</b> :20-2.	Study does not meet inclusion criteria of systematic review as conducted in residential care Home
Caplan GA, Harper EL. Recruitment of volunteers to improve vitality in the elderly: the REVIVE study. <i>Intern Med J</i> . 2007; <b>37</b> :95-100.	Study does not meet inclusion criteria of systematic review as no results relating directly to assistance at mealtimes
Cartwright A. The ward hostess: a quality initiative. <i>Nurs Times</i> . 2000; <b>96</b> :37-8.	Not a study; description of local initiative – the introduction of ward hostesses on a medical ward and care for the elderly ward
Christensson L, Unosson M, Bachrach-Lindstrom M, Ek AC. Attitudes of nursing staff towards nutritional nursing care. <i>Scand J Caring Sci</i> . 2003; <b>17</b> :223-31.	Study does not meet inclusion criteria of systematic review as explored nurses' attitude towards nutritional care
Connolly A, Whelan K, M. H. Impact of protected mealtimes on mealtime environment and nutrient intake in hospital patients. <i>J Hum Nutr Dietetics</i> . 2011; <b>24</b> :279-80.	Conference abstract full paper retrieved
Conway J, Kearin M. The contribution of the Patient Support Assistant to direct patient care: an exploration of nursing and PSA role perceptions. <i>Contemp Nurse</i> . 2007; <b>24</b> :175-88.	Study does not meet inclusion criteria of systematic review as explores the role of patient support assistants and direct patient care

Cooper C, Brierley ER, Burden ST. Improving adherence to a care plan generated from the Malnutrition Universal Screening Tool. <i>Eur J Clin Nutr.</i> 2013; <b>67</b> :174-9.	Study does not meet inclusion criteria of systematic review as age of patients not specified – all adult patients
Cosh J. The meal makeover. <i>Nurs Standard.</i> 2011; <b>26</b> :23.	Not a study, Brief description only of volunteer feeding assistance
Crack J, Crack G. Promoting quality care for older people in meal management: whose responsibility is it? <i>Aus J Adv Nurs.</i> 2007; <b>25</b> :85-9.	Study does not meet inclusion criteria of systematic review as role of nurses in residential aged care
Das AR, McDougall T, Smithson J, West R. Benefits of family mealtimes for nursing home residents: Protecting mealtimes may similarly benefit elderly inpatients. <i>BMJ.</i> 2006; <b>332</b> :1334-5.	Letter – author contacted for further details no reply
Davidson A, Scholefield H. Protecting mealtimes. <i>Nurs Manage.</i> 2005; <b>12</b> :32-6.	Study does not meet inclusion criteria of systematic review as audit of who interrupts patients at mealtimes and reasons for interruptions
Davies C. Mealtime solutions. <i>Nurs Standard.</i> 2007; <b>21</b> :21-3.	Not a study; description of local initiatives (red tray, yellow napkins but no evaluation)
De Wit E, Goeminne P, Burtin C, Valcke Y. Food intake and appreciation of a new food delivery system in hospitals: Meals on wheels (a prospective cohort trial). <i>Clin Nutr Suppl.</i> 2011; <b>6</b> :64.	Conference abstract full paper retrieved
Goeminne PC, De Wit EH, Burtin C, Valcke Y. Higher food intake and appreciation with a new food delivery system in a Belgian hospital. Meals on Wheels, a bedside meal approach. A prospective cohort trial. <i>Appetite.</i> 2012; <b>59</b> :108-16.	Study does not meet inclusion criteria of systematic review as investigates food delivery service
Dean E. Regular ward checks raise standards of care. <i>Nurs Manage.</i> 2012; <b>19</b> :12-6.	Study does not meet inclusion criteria of systematic review as discusses a checklist for intentional rounding
DeLegge M, Kelley A. State of nutrition support teams <i>Nutr Clin Pract.</i> 2013; <b>28</b> :691-7.	Not a study; discussion article on the state of nutrition support teams in implementing parental and enteral nutrition
Desjardins F, Cardinal L, Belzile E, McCusker J. Reorganizing nursing work on surgical units: a time-and-motion study. <i>Nurs Leadership.</i> 2008; <b>21</b> :26-38.	Study does not meet inclusion criteria of systematic review as time and motion study
Duke T. The mealtime experience: dignified and respectful dining. <i>Nurs Residential Care.</i> 2013; <b>15</b> :272-5.	Study does not meet inclusion criteria of systematic review as conducted in care homes
Dupertuis YM, Kossovsky MP, Kyle UG, Raguso CA, Genton L, Pichard C. Food intake in 1707 hospitalised patients: a prospective comprehensive hospital survey. <i>Clin Nutr.</i> 2003; <b>22</b> :115-23.	Study does not meet inclusion criteria of systematic review as explores food intake and factors affecting intake
Easterling C, Robbins E. Dementia and dysphagia.	Not a study; description of feeding for

<i>Geriatr Nurs.</i> 2008; <b>29</b> :275-85.	patients with dementia and dysphagia
Edwards J, Hartwell H. A comparison of energy intake between eating positions in a NHS hospital--a pilot study. <i>Appetite.</i> 2004; <b>43</b> :323-5.	Study does not meet inclusion criteria of systematic review as intervention about eating positions for all adult patients
Flint L. Nutrition and hydration in hospital. <i>Nurs Standard.</i> 2013; <b>27</b> :59.	Not a study; descriptive article of nutrition and hydration
Fulham J. Improving the nutritional status of colorectal surgical and stoma patients. <i>Br J Nurs.</i> 2004; <b>13</b> :702-8.	Study does not meet inclusion criteria of systematic review as describes availability of food post operatively
Garrow D, Pride P, Moran W, Zapka J, Amella E, Delegge M. Feeding alternatives in patients with dementia: examining the evidence. <i>Clin Gastroenterol Hepatol.</i> 2007; <b>5</b> :1372-8.	Not a study; literature review of enteral feeding
Gentleman C, Monaghan H. What's food got to do with it? The Dewsbury Link Nurse project. <i>Found Nurs Stud Diss Ser.</i> 2005; <b>2</b> :1-4.	Not a study; an audit of meal provision
Green S, Watson R. Nutritional screening and assessment tools for use by nurses: literature review. <i>J Adv Nurs.</i> 2005; <b>50</b> :69-83.	Review screening for nutritional risk / . malnutrition
Green S, Martin H, Roberts H. A systematic review of the use of volunteers to improve mealtime care of adult patients or residents in institutional settings. <i>J Clin Nurs.</i> 2011; <b>20</b> :1810-23.	Not a study; systematic review article: relevant papers retrieved
Green B, Raymond G, Peardon J, Fox D, Hawkes B, Cornes M. 'Not just grapes and flowers': older people's perspectives on the role and importance of hospital visiting. <i>Qual Ageing Older Adults .</i> 2012; <b>13</b> :82-8.	Older relatives perceptions of mealtimes in hospital
Gunnarsson AK, Lonn K, Gunningberg L. Does nutritional intervention for patients with hip fractures reduce postoperative complications and improve rehabilitation? <i>J Clin Nurs.</i> 2009; <b>18</b> :1325-33.	Study does not meet inclusion criteria of systematic review as about malnutrition and healing focus
Hairon N. Guidance on improving the nutrition of hospital patients. <i>Nurs Times.</i> 2007; <b>103</b> :23-4.	Not a study; discussion article on improving nutrition of hospital patients
Hall JC. Choosing nutrition support: how and when to initiate. <i>Nurs Case Manage.</i> 1999; <b>4</b> :212-20.	Not a study; discussion article on choosing nutrition support
Hallpike B. Promoting good nutrition in patients with dementia. <i>Nurs Standard.</i> 2008; <b>22</b> :37-43.	Not a study; discussion article on general guidance for dementia patients
Harris CL, Fraser C. Malnutrition in the institutionalized elderly: the effects on wound healing. <i>Ostomy Wound Manage.</i> 2004; <b>50</b> :54-63.	Not a study; discussion article on malnutrition in wound healing
Harrop A. Poor nutritional standards in our hospitals. <i>Br J Community Nurs.</i> 2009; <b>14</b> :444, 446-7.	Not a study; opinion article nutrition standards
Hartwell H, Shepherd P, Edwards J. Effects of a hospital ward eating environment on patients' mealtime	Study does not meet inclusion criteria of systematic review as age of patients not

experience: A pilot study. <i>Nutr Diet</i> . 2013; <b>70</b> :332-8.	specified
Harvey TB, Coulter SG, Zublena L, Woodard EK. Silver Spoons: volunteers and patient-centered meals. <i>Nurs Manage</i> . 2013; <b>44</b> :8-10.	Not a study; description only of volunteer feeding assistance
Hickson M, Frost G. An investigation into the relationships between quality of life, nutritional status and physical function. <i>Clin Nutr</i> . 2004; <b>23</b> (2):213-21.	Study does not meet inclusion criteria of systematic review as study regarding nutritional status and quality of life
Hickson M, Nicholl C, Bulpitt C, Fry M, Frost G, Davies L. The design of the feeding support trial - does intensive feeding support improved nutritional status and outcome in acutely ill older in-patients? <i>J Hum Nutr Diet</i> . 1999; <b>12</b> :53-9.	Not a study, details of a proposed study
Hickson M, Connolly A, Whelan K. Impact of protected mealtimes on ward mealtime environment, patient experience and nutrient intake in hospitalised patients. <i>J Hum Nutr Diet</i> . 2011; <b>24</b> :370-4.	Study does not meet inclusion criteria of systematic review as age of patients not specified – all adult patients
Hoekstra JC, Goosen JH, de Wolf GS, Verheyen CC. Effectiveness of multidisciplinary nutritional care on nutritional intake, nutritional status and quality of life in patients with hip fractures: a controlled prospective cohort study. <i>Clin Nutr</i> . 2011; <b>30</b> :455-61.	Study does not meet inclusion criteria of systematic review as eating assistance part of a wider intervention and not reported separately
Holman C, Roberts S, Nicol M. Promoting adequate nutrition. <i>Nurs Older People</i> . 2005; <b>17</b> :31-2.	Not a study: discussion article on general nutrition
Holmes S. The effects of undernutrition in hospitalised patients. <i>Nurs Standard</i> . 2007; <b>22</b> :35-8.	Not a study: discussion article on undernutrition
Holmes S. Nutrition and eating difficulties in hospitalised older adults. <i>Nurs Standard</i> . 2008; <b>22</b> :47-57.	Not a study; discussion paper on eating difficulties in older adults
Holst M, Rasmussen H, Laursen B. Can the patient perspective contribute to quality of nutritional care? <i>Scand J Car Sci</i> . 2011; <b>25</b> :176-84.	Study does not meet inclusion criteria of systematic review as explored patient's experiences of being under nourished
Horan D, Coad J. Can nurses improve patient feeding? <i>Nurs Times</i> 2001; <b>96</b> :33-4.	Study does not meet inclusion criteria of systematic review as survey of reasons why meals are missed
Hunt L. Rising to the nutrition challenge. <i>Nurs Times</i> . 2007; <b>103</b> :16-9.	Unavailable
Kayser-Jones J, Schell E. The effect of staffing on the quality of care at mealtime. <i>Nurs Outlook</i> . 1997; <b>45</b> :64-72.	Study does not meet inclusion criteria of systematic review as conducted in a nursing home
Keller H, Allard J. What do patients say about nutrition care in canadian hospitals? <i>Clin Nutr Suppl</i> . 2011; <b>6</b> :212.	Study does not meet inclusion criteria of systematic review as explored reasons for not eating
Kowanko I. The role of the nurse in food service: a literature review and recommendations. <i>Int J Nurs</i>	Not a study; literature review on the role of

<i>Pract.</i> 1997; <b>3</b> :73-8	the nurse in nutrition and food service
Kuppinger D, Hartl WH, Bertok M, <a href="#">Hoffmann JM</a> , <a href="#">Cederbaum J</a> , <a href="#">Küchenhoff H</a> et al. Nutritional screening for risk prediction in patients scheduled for abdominal operations. <i>Br J Surg.</i> 2012; <b>99</b> :728-37.	Study does not meet inclusion criteria of systematic review as investigated factors contributing to post-operative complications and pre surgery weight loss
Larsen L, Uhrenfeldt L. Patients' lived experiences of a reduced intake of food and drinks during illness: a literature review. <i>Scand J Caring Sci.</i> 2013; <b>27</b> :184-94.	Not a study; systematic review article: relevant papers retrieved
Lassen K, Kruse F, Bjerrum M, Jensen L, Hermansen K. Nutritional care of Danish medical inpatients: effect on dietary intake and the occupational groups' perspectives of intervention. <i>Nutr J.</i> 2004; <b>3</b> :12.	Study does not meet inclusion criteria of systematic review as explored nursing procedures with regard to assessing nutritional status and managing nutritional outcome
Lassen KO, Grinderslev E, Nyholm R. Effect of changed organisation of nutritional care of Danish medical inpatients. <i>BMC Health Ser Res.</i> 2008; <b>8</b> :168.	Study does not meet inclusion criteria of systematic review as no results relating directly to assistance at mealtimes
Lecko C. We can no longer blame the quality of hospital food for malnutrition in hospitals. <i>Nurs Times.</i> 2006; <b>102</b> :12.	Unavailable
Lin LC, Watson R, Wu SC. What is associated with low food intake in older people with dementia? <i>J Clin Nurs.</i> 2010; <b>19</b> :53-9.	Study does not meet inclusion criteria of systematic review as conducted in a long term care facility
Lindman A, Rasmussen H, Andersen N. Food caregivers influence on nutritional intake among admitted haematological cancer patients - a prospective study. <i>Eur J Oncol Nurs.</i> 2013; <b>17</b> :827-34.	Study does not meet inclusion criteria of systematic review as all adult patients over 18 years
Littlewood S, Saedi S, Williams C. Mealtimes: a missed opportunity? <i>J Dement Care</i> 1997; <b>5</b> :18-20	Study does not meet inclusion criteria of systematic review as assessed existing practices and attitudes towards mealtimes
Liu W, Cheon JH, Thomas S. Interventions on mealtime difficulties in older adults with dementia: a systematic review. <i>Int J Nurs Studies.</i> 2014; <b>51</b> :14-27.	Not a study: a systematic review and papers on feeding assistance related to nursing homes and long term residential care
Lomas C. Nutritional benefits. <i>Nurs Standard.</i> 2012; <b>26</b> :20-2.	Not a study; description only of volunteer feeding assistance
Manthorpe J, Watson R. Poorly served? Eating and dementia. <i>J Adv Nurs.</i> 2003; <b>41</b> :162-9.	Not a study; literature review with discussion eating difficulties in dementia
Martinsen B, Norlyk A. Caregivers' lived experience of assisted feeding. <i>J Clin Nurs.</i> 2012; <b>21</b> :2966-74.	Study does not meet inclusion criteria of systematic review as nurse experience of all patients on general wards
Martinsen B, Norlyk A. Observations of assisted feeding among people with language impairment. <i>J Clin Nurs.</i> 2012; <b>21</b> :2949-57.	Study does not meet inclusion criteria of systematic review as patients under 65 years

McGillivray T, Marland GR. Assisting demented patients with feeding: problems in a ward environment. A review of the literature. <i>J Adv Nurs</i> 1999; <b>29</b> :608-14.	Not a study; review article: relevant papers retrieved
McGlone P, Dickerson J, Davies G. The feeding of patients in hospital: a review. <i>J R Soc Promot Health</i> . 1995; <b>115</b> :282-8.	Not a study; a discussion article reviewing the feeding of patients in hospital
Medin J, Windahl J, von Arbin M. Eating difficulties among stroke patients in the acute state: a descriptive, cross-sectional, comparative study. <i>J Clin Nurs</i> .. 2011; <b>20</b> :2563-72.	Study does not meet inclusion criteria of systematic review as description of eating difficulties
Miceli BV. Nursing unit meal management maintenance program. Continuation of safe-swallowing and feeding beyond skilled therapeutic intervention. <i>J Gerontol Nurs</i> . 1999; <b>25</b> :22-36.	Study does not meet inclusion criteria of systematic review as a meal management programme for dysphasic patients
Mould J. Nurses 'must' take control of the nutritional needs of stroke patients. <i>Br J Nurs</i> . 2009; <b>18</b> :1410-4.	Study does not meet inclusion criteria of systematic review as observational study of nutritional practice
Mudge AM, Ross LJ, Young AM, Isenring EA, Banks MD. Helping understand nutritional gaps in the elderly (HUNGER): a prospective study of patient factors associated with inadequate nutritional intake in older medical inpatients. <i>Clin Nutr</i> . 2011; <b>30</b> :320-5.	Study does not meet inclusion criteria of systematic review as prospective cohort study on energy intake and resting energy expenditure
Murray C. Improving nutrition for older people. <i>Nurs Older People</i> . 2006; <b>18</b> :18-22.	Not a study; discussion paper of the introduction of protected mealtimes
Ng J, Mellor D, Narayanan D. Do protected mealtimes improve inpatient glycaemic control? <i>J Diabetes Nurs</i> . 2010; <b>14</b> :234-8.	Study does not meet inclusion criteria of systematic review as patients under 65 years
Nip WF, Perry L, McLaren S, Mackenzie A. Dietary intake, nutritional status and rehabilitation outcomes of stroke patients in hospital. <i>J Hum Nutr Diet</i> . 2011; <b>24</b> :460-9.	Study does not meet inclusion criteria of systematic review as describes problems of nutritional status over time in hospital
Ockenga J, Freudenreich M, Zakonsky R, Norman K, Pirlich M, Lochs H. Nutritional assessment and management in hospitalised patients: implication for DRG-based reimbursement and health care quality. <i>Clin Nutr</i> . 2005; <b>24</b> :913-9.	Study does not meet inclusion criteria of systematic review as looked at cost implications of nutrition screening
Ofei K, Holst M, Rasmussen H, Mikkelsen BE. How practice contributes to trolley food waste. A qualitative study among staff involved in serving meals to hospital patients. <i>Appetite</i> . 2014; <b>83</b> :49-56.	Study does not meet inclusion criteria of systematic review as a study about food waste and staff views of food waste
Oxtoby K. Making mealtimes pleasurable. <i>Nurs Times</i> . 2008; <b>104</b> :7-8.	Unavailable
Oxtoby K. Food champions. <i>Nurs Times</i> . 2008; <b>104</b> :21.	Unavailable



Papier I, Chermesh I. Nurses' perceptions about nutritional treatment differ according to their role in the department. <i>Clin Nutr Suppl.</i> 2012; <b>7</b> :237.	Study does not meet inclusion criteria of systematic review as explored nurses attitudes towards nutrition
Parker J, Miller L. Using enter-and-view provision to review hospital nutritional care. <i>Nurs Manage.</i> 2011; <b>18</b> :26-9.	Not a study; Audit of nutrition screening a
Pedersen PU, Tewes M, Bjerrum M. Implementing nutritional guidelines - the effect of systematic training for nurse nutrition practitioners. <i>Scand J Caring Sci.</i> 2012; <b>26</b> :178-85.	Study does not meet inclusion criteria of systematic review as patients under 65 years of age
Plum LM. An observational study of meals at hospital from a patient perspective. <i>Clin Nutr Suppl.</i> 2011; <b>6</b> :112-3.	Study does not meet inclusion criteria of systematic review as investigated the social perspective around mealtime processes
Ramm B, Smith J. Improving mealtimes. <i>J Dement Care.</i> 2009; <b>17</b> :10-1.	Not a study; description of protected mealtimes and staff training
Roberts H, Pilgrim A, Elia M, <a href="#">Jackson AA</a> , <a href="#">Cooper C</a> , <a href="#">Sayer AA</a> et al. Southampton mealtime assistance study: design and methods. <i>BMC Geriatr.</i> 2013; <b>13</b> .	Not a study, details of a proposed study
Russell C, Capezuti E. Nutrition in Hospitals: Mealtimes Matter. <i>Geriatr Nurs.</i> 2012; <b>33</b> :398-400.	Not a study; description only of volunteer feeding assistance
Sneddon J. Using mealtime volunteers to support patients. <i>Nurs Times.</i> 2011; <b>107</b> :21-3.	Not a study; description only of volunteer feeding assistance
Sneddon C, Best J. Introduction of mealtime volunteers in a district general hospital. <i>Nurs Standard.</i> 2011; <b>26</b> :37-40.	Not a study; description only of volunteer feeding assistance
Snow T. 'If one hospital can give patients dignified care, all of them can'. <i>Nurs Standard.</i> 2011; <b>25</b> :12-4.	Not a study; discussion of Care Quality Commission report
Soderstrom L, Thors Adolfsson E, Rosenblad A, Frid H, Saletti A, Bergkvist L. Mealtime habits and meal provision are associated with malnutrition among elderly patients admitted to hospital. <i>Clin Nutr.</i> 2013; <b>32</b> :281-8.	Study does not meet inclusion criteria of systematic review as a cross sectional study for nutrition assessment for malnutrition
Stanner S. Preparing food and assisting clients at mealtimes. <i>Nurs Resident Care.</i> 2003; <b>5</b> :56-61.	Study does not meet inclusion criteria of systematic review as conducted in nursing homes
Stockdell R, Amella E. The Edinburgh Feeding Evaluation in Dementia scale. <i>Am J Nurs.</i> 2008; <b>108</b> :46-55.	Study does not meet inclusion criteria of systematic review as an assessment tool for dementia patients
Stuckley C, Bakewell L, Ford G. The effect of a protected mealtime policy on the energy intake and frequency of non-urgent interruptions during mealtimes at the Royal Bournemouth Hospital. <i>Proc Nutr Soc.</i> 2010; <b>69</b> :E526.	Abstract of a conference proceeding – full paper in review

Tanner J. Visiting time preferences of patients, visitors and staff. <i>Nurs Times</i> . 2005; <b>101</b> :38-42.	Study does not meet inclusion criteria of systematic review as explored feelings on open visiting
Taylor J. Finding more time to care. <i>Health Serv J Supple</i> . 2007; <b>117</b> :15-7.	Study does not meet inclusion criteria of systematic review as explored meal round processes
Taylor J. Food for thought. <i>Nurs Times</i> . 2007; <b>103</b> :12-4.	Unavailable
Taylor A. Exploring patient, visitor and staff views on open visiting. <i>Nurs Times</i> . 2008; <b>104</b> :30-3.	Study does not meet inclusion criteria of systematic review as explored feelings on open visiting
Taylor J. Eat, drink and be healthy: malnutrition on the wards. <i>Health Serv J</i> . 2009; <b>119</b> :22-3.	Not a study, discussion article on malnutrition in hospital wards
Thomas J, Davies S. A nurse-led, multiprofessional approach to nutrition. <i>Nurs Times</i> . 2008; <b>104</b> :31.	Not a study; description of the implementation of procedures for nutritional care
Triggle N. Providing comfort and support to older people. <i>Emerg Nurs</i> . 2012; <b>20</b> :10-3.	Not a study; role of A&E support worker
Triggle N. Campaign calls for mandatory standards for hospital food. <i>Nurs Manage</i> . 2013; <b>20</b> :6-7.	Not a study; discussion article on food standards in hospital
Turner JT, Lee V, Fletcher K, Hudson K, Barton D. Measuring quality of care with an inpatient elderly population. The geriatric resource nurse model. <i>J Gerontol Nurs</i> . 2001; <b>27</b> :8-18.	Study does not meet inclusion criteria of systematic review as explored quality of care but did not include assistance with eating
Unknown. Nutritional care and older people. <i>Community Care</i> . 2009; <b>1770</b> :32-3.	Unavailable
Unknown. Hospital changes visiting times so relatives can assist with meals. <i>Nurs Standard</i> . 2012; <b>26</b> :10-11.	Not a study; discussion article regarding changing mealtimes in line with visiting times
Vere-Jones E. Making patient nutrition a top priority. <i>Nurs Times</i> . 2007; <b>103</b> :8-9.	Unavailable
Walton K, Williams R, Tapsell L, Batterham M. Rehabilitation inpatients are not meeting their energy and protein needs. <i>Eur J Clin Nutr Metabol</i> 2007; <b>2</b> :120-6.	Study does not meet inclusion criteria of systematic review as investigated amounts of energy and protein required
Warren T, Ream H. Embedding excellent nutrition care practices in an acute hospital ward. <i>Found Nurs Stud Diss Ser</i> . 2012; <b>8</b> :1-28.	Study does not meet inclusion criteria of systematic review as age of patients not specified – all adult patients
Waters A. Time to share. <i>Nurs Standard</i> . 2007; <b>21</b> :20-3.	Not a study; description only of volunteer feeding assistance
Watkins S. Improving patient nutrition through simple initiatives. <i>NursTimes</i> . 2006; <b>102</b> :28-30.	Not a study; description of local initiatives (red tray, protected mealtimes) evaluation conducted but no statistical analysis

	reported
Watson R, Deary I. A longitudinal study of feeding difficulty and nursing intervention in elderly patients with dementia. <i>J Adv Nurs</i> 1997; <b>26</b> :25-32.	Study does not meet inclusion criteria of systematic review as modelling of relationship between nursing intervention and feeding difficulty
Watters CA, Sorensen J, Fiala A, Wismer W. Exploring patient satisfaction with foodservice through focus groups and meal rounds. <i>JADA</i> . 2003; <b>103</b> :1347-9.	Study does not meet inclusion criteria of systematic review as satisfaction with food service for all adults over 18 years
Westergren A, Ohlsson O, Rahm Hallberg I. Eating difficulties, complications and nursing interventions during a period of three months after a stroke. <i>J Adv Nurs</i> 2001; <b>35</b> :416-26.	Study does not meet inclusion criteria of systematic review as described eating difficulties and swallowing in patients with dysphasia
Westergren A, Wann-Hansson C, Borgdal EB, <a href="#">Sjölander J</a> , <a href="#">Strömblad R</a> , <a href="#">Klevsgård R</a> et al. Malnutrition prevalence and precision in nutritional care differed in relation to hospital volume--a cross-sectional survey. <i>Nutr J</i> . 2009; <b>8</b> :20.	Study does not meet inclusion criteria of systematic review as all adults over 18 years
Westergren A, Karlsson S, Andersson P, Ohlsson O, Hallberg IR. Eating difficulties, need for assisted eating, nutritional status and pressure ulcers in patients admitted for stroke rehabilitation. <i>J Clin Nurs</i> .. 2001; <b>10</b> :257-69.	Study does not meet inclusion criteria of systematic review as observational study on patients in definition of feeding assistance included cutting/buttering, total assistance, partly or totally parenterally or enterally fed
Westergren A, Unosson M, Ohlsson O, Lorefalt B, Hallberg IR. Eating difficulties, assisted eating and nutritional status in elderly (> or = 65 years) patients in hospital rehabilitation. <i>Int J Nurs Stud</i> . 2002; <b>39</b> :341-51.	Study does not meet inclusion criteria of systematic review as observational study of eating difficulties and nutritional status in rehabilitation hospital
Whitelock G, Aromataris E. Effectiveness of mealtimes interventions to improve nutritional intake of adult patients in the acute care setting: a systematic review <i>JBI Database Syst Rev Implement Rep</i> . 2013; <b>11</b> :263-305.	Not a study; systematic review, relevant references retrieved
Williams L, Jones J, Davidson H, Bannerman E. A study of fluid provision and consumption in a rehabilitation hospital in Scotland, UK. <i>Proc Nutr Soc</i> . 2011; <b>70</b> :E264.	Study does not meet inclusion criteria of systematic review as explored issues around food provision
Williams L, Jones J, Davidson HIM, Bannerman E. An investigation into food provision and consumption in an orthopaedic rehabilitation hospital in Scotland, UK. <i>Proc Nutr Soc</i> . 2011; <b>70</b> :E303.	Study does not meet inclusion criteria of systematic review as explored issues around food provision
Wilson N, Best C. Feeding hospital patients: a multiprofessional approach. <i>Nurs Times</i> . 2012; <b>108</b> :17-8.	Not a study; discussion article on feeding hospital patients
Wong SS, Graham A, Green D, Hirani SP, Grimble G, Forbes A. Meal provision in a UK national spinal injury centre-a qualitative audit of service users and stakeholders. <i>Proc Nutr Soc</i> . 2011; <b>70</b> :E276.	Study does not meet inclusion criteria of systematic review as described meal provision for patients with spinal injuries

Wright L, Cotter D, Hickson M. The effectiveness of targeted feeding assistance to improve the nutritional intake of elderly dysphagic patients in hospital. <i>J Hum Nutr Diet</i> . 2008; <b>21</b> :555-62.	Study does not meet inclusion criteria of systematic review as involves feeding textured modified diets to d dysphasic patients
Dickinson A, Welch C, Ager L. Improving the health of older people: implementing patient-focused mealtime practice. <i>Found Nurs Stud Diss Ser</i> . 2006; <b>3</b> :1-4.	Duplicate reporting of Dickinson et al. 2008, with no empirical data representing participants and their voices
Dickinson A, Welch C, Ager L, Costar A. Hospital mealtimes: action research for change? <i>Proc Nutr Soc</i> . 2005; <b>64</b> :269-75.	Duplicate reporting of Dickinson et al. 2008, with no empirical data representing participants and their voices
Welch R. Mealtimes with the elderly: results of videotaped research. <i>Br J Healthcare Assistants</i> . 2007; <b>1</b> :129-32.	Practice development underpinned by action research but no empirical data presented to back up findings
Wong A, Burford S, Wyles CL, Mundy H, Sainsbury R. Evaluation of strategies to improve nutrition in people with dementia in an assessment unit. <i>J Nutr Health Aging</i> . 2008; <b>12</b> :309-12.	Study does not meet inclusion criteria of systematic review as conducted on dementia assessment and rehabilitation unit.

**Appendix IX: Studies excluded on critical appraisal**

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Score
Xia et al. 2006	N	N	N/A	UC	N/A	NA	N	UC	N	0/7
Bradley and Rees 2003	N	N	N	N	N/A	N/A	N/A	UC	N	0/5

Y=Yes, N=No, UC = unclear, N/A=not applicable

**Xia et al. 2006:** Mealtimes in hospital – who does what?

Xia C, McCutcheon H. Mealtimes in hospital--who does what? *J Clin Nurs*. 2006;**15**:1221-7.

Very poor quality descriptive study including both qualitative and quantitative data. Not enough detail provided of the two medical wards involved or the patients and nurses who were interviewed.

**Bradley and Rees 2003:** Reducing nutritional risk in hospital: the red tray

Bradley L, Rees C. Reducing nutritional risk in hospital: the red tray. *Nurs Standard*. 2003;**17**:33-7.

Cross sectional audit and no sample details provided or statistical analysis conducted

## Appendix X: Included studies tables

Study, Country, Aim	Methods	Participants details, Setting	Interventions	Outcomes assessed
<b>Robinson et al. 2002<sup>15</sup></b> USA  To determine if hospitalised elders would consume a greater proportion of their meals if they receive feeding assistance from trained volunteers	<b>Study design</b> Mixed methods  Controlled trial Matched on age, type of assistance required and reason help needed)  <b>Duration of study</b> 2 months	<b>Participants</b> Control (n=34) Intervention (n=34)  <b>Setting</b> One medical unit  <b>Age</b> Over 65 years Further details not reported  <b>Gender</b> No details reported  <b>Reasons for admission</b> No details reported	<b>Intervention</b> Volunteer Feeding Assistance (meal mates)  <b>Control</b> The matched control group received usual care which was being fed by nursing staff  <i>Definition of mealtimes</i> No details reported  <i>Definition of feeding assistance</i> Feeding and social interaction  <i>Training</i> 3 hour in-service training  <i>Recruitment of patients</i> Patients over 65 years without swallowing difficulties but requiring assistance with eating were identified	<b>Outcome assessed</b> % Energy intake (daily)  <i>Food intake</i> Estimate percentage of food and fluids on tray consumed recorded on bedside  <i>Nutritional analysis</i> Not details reported
<b>Walton et al. 2008<sup>20</sup></b> Australia  To evaluate the lunchtime assistance program in terms of dietary intakes by comparing data from weekdays (with volunteers) and that from weekends (no volunteers)	<b>Study design</b> Single group case series Pilot study  <b>Duration of study</b> In August 2006	<b>Participants</b> Elderly patients (n=9) acted as their own controls for other meals  Volunteers (n=10) Nurses (n=13)  <b>Setting</b> One aged care ward	<b>Intervention</b> Volunteer feeding assistance Meal tray set up, opening packets, feeding encouragements and conversation.  <b>Control</b> Usual care No volunteer feeding assistance  <i>Training</i> Volunteers trained Duration of training not specified	<b>Outcomes assessed</b> Protein intake (g) Energy intake (KJ) % meeting nutritional requirements  Experiences of volunteers, nurses and patients in relation to feeding assistance  <i>Food intake</i>

		<p><b>Age (years)</b> Mean age 89 <math>\pm</math> 4.6</p> <p><b>Gender</b> Female n=6 (67%)</p> <p><b>Reasons for admission</b> The most common causes of admission were limb injury and decreased mobility, closely followed by dementia and delirium</p>	<p><i>Definition of mealtimes</i> Lunchtimes on weekdays</p> <p><i>Definition of feeding assistance</i> Feeding, opening packages, tray set up, encouragement and/or social support at mealtimes.</p> <p><i>Selection of patients</i> Patients needed assistance were referred to the program by the Nurse Unit Manager or Clinical Care Coordinator</p>	<p>Uneaten food was weighed and compared to duplicate samples of meals to determine standard serving size. Electronic scales used to weigh plate waste.</p> <p><i>Nutritional analysis</i> Xyris Software</p>
<p><b>Buys et al. 2013<sup>14</sup></b> USA</p> <p>To describe the SPOONS volunteer feeding assistance program, summarize and describe services provided by volunteers that may promote nutritional intake</p>	<p><b>Study Design</b> Descriptive evaluation</p> <p><b>Duration of study</b> Data collected over 39 months January 2008 to March 2010</p>	<p><b>Participants</b> 235 patient-volunteers encounter</p> <p><b>Setting</b> Acute Care for Elders Unit</p> <p><b>Age (years)</b> Older adults Further details not reported</p> <p><b>Gender</b> No details reported</p> <p><b>Reasons for admission</b> No details reported</p>	<p><b>Intervention</b> Volunteer feeding program—Support for and Promotion Of Optimal Nutritional Status (SPOONS)</p> <p><b>Control</b> None</p> <p><i>Training</i> Volunteers trained - Over 3 sessions.</p> <p><i>Definition of mealtimes</i> No details reported</p> <p><i>Definition of feeding assistance</i> SPOONS volunteers provide assistance with tasks including passing out or collecting trays, tray set-up, verbal encouragement and prompting to eat, and feeding the patient.</p> <p><i>Selection of patients</i> Patients who would benefit from socialization, require assistance with tray set-up, prompting to eat, or feeding</p>	<p><b>Outcomes assessed</b> Tasks completed by the volunteer Time spent with each patient</p>

			assistance and do not have dysphagia and are cognitively able to interact with a volunteer are eligible for the SPOONS program and are identified during the daily rounds.	
<p><b>Huxtable and Palmer 2013<sup>32</sup></b> Australia</p> <p>To compare mealtime interruptions, mealtime assistance received, and nutritional intakes before and after Protected Mealtimes Programme implementation in adult inpatients on acute wards</p>	<p><b>Study design</b> Before and after study</p> <p><b>Duration of study</b> Aug 2010 - Dec 2011</p>	<p><b>Participants</b> 1632 observations (Intervention n=833 / Control n=799 on 1012 hospitalised patients)</p> <p><b>Settings</b> One of six adult acute wards General medicine and palliative care Surgical (gynaecology/GI) Orthopaedic Medical/acute stroke Medical /respiratory Cardiac</p> <p><b>Age (years)</b> Intervention : 66 <math>\pm</math>18 Control: 65<math>\pm</math> 18</p> <p><b>Gender</b> Intervention Female n=431 (52%)</p> <p>Control Female n=367 (46%)</p> <p><b>Reasons for admission</b> No details reported</p>	<p><b>Intervention</b> Protected mealtimes with the following initiatives Volunteers - introduced to provide patient with mealtimes assistance Foodservice staff – placing meal trays within patients reach, delivery and collecting trays in ways that maximised the time provided to patients to eat Speech pathologists – redesigned clinics so no longer during lunchtimes Allied health, medical and medical imaging staff – decrease inpatient procedures at lunchtimes</p> <p><b>Control</b> Wards before the introduction of protected mealtimes</p> <p><b>Training</b> In service training for staff Volunteer training not reported</p> <p><b>Definition of mealtimes</b> Weekday breakfasts, lunches and dinners</p> <p><b>Definition of feeding assistance</b> Mealtime assistance encompassed any type of assistance required at meals, including setting up of meals, cutting up food , encouraging to eat and providing feeding assistance</p>	<p><b>Outcomes assessed</b> Energy intake (KJ) Protein intake (g)</p> <p><i>Addressing barriers to consumption</i> Appropriate position of patient of patient during meal Time of delivery and collection of meal tray Whether meal was within patients reach</p> <p><i>Interruptions</i></p> <p><i>Mealtime assistance</i> Level of mealtime assistance received and by whom</p> <p><i>Food intake</i> Observations plus visual estimate of proportion consumed (&lt;1/4, 1/4-&lt;1/2, 1/2-3/4, &gt;3/4)</p> <p><i>Nutritional analysis</i> The promotion of food and drinks consumed as converted into energy and protein using average</p>



			<i>Selection of patients</i> Patients were documented as requiring assistance if they had a purple lid on their tray (information obtained from medical records), or appeared to require mealtime assistance using clinical judgement	nutrient values
<b>Hickson et al. 2004<sup>19</sup></b> UK  To examine whether health care assistants, trained to provide additional support with feeding, can improve acutely ill elderly in-patients' clinical outcomes.	<b>Study design</b> Randomized Controlled Trial  Randomization was stratified by ward  <b>Duration of study</b> June 1998 and February 2000	<b>Participants</b> Patients admitted (n=1176) Patients eligible (n=592) / 55 Intervention (n=292) Control (n=300)  <b>Settings</b> Three acute medicine for the elderly wards  <b>Age (years)</b> All over 65 years no further details) reported  <b>Gender</b> Intervention Female n=127 (56%)  Control Male: n=208 (69%)  <b>Reasons for admission</b> No details reported	<b>Intervention</b> The intervention (feeding support) group received additional nutritional care from a trained health care assistant  <b>Control</b> Usual ward care  <b>Training</b> 15 hours  <b>Definition of mealtimes</b> 5 days a week to cover two meals  <b>Feeding assistance</b> Positioning of patient, ensuring meal tray within reach, packets are open and lids removed, correct food is served, vision is optimised, discussing nutritional needs with relatives, denture are in place, assisting with cutting up food, providing additional milky drinks or distributing prescribed supplements and providing encouragement . An additional member of staff who can focus solely on nutritional care  <b>Selection of patients</b> All patients admitted during time period were eligible	<b>Outcomes assessed</b> Length of stay Mortality Protein intake (g) Energy intake (KJ)  <i>Infection rates</i> Number of antibiotics prescribed  <i>Functional status</i> Barthel score Grip strength(kgf)  <i>Nutritional status</i> MAC (cm), TST (mm), MAMC(cm) BMI(kg/m <sup>2</sup> ), Weight (kg)  <i>Food intake</i> Food intake assessment was carried out on 6% of the patients, using a combination of weighing the main meals and food records for breakfast, snacks and drinks  <i>Nutritional analysis</i> Dietplan 5
<b>Wright et al. 2006<sup>18</sup></b> UK	<b>Study design</b> Quasi-experimental	<b>Participants</b> Patients (n=48)	<b>Intervention</b> Dining room: patients were encouraged to	<b>Outcomes assessed</b> Energy intake (Kcal)

<p>To investigate the effect of eating in a supervised dining room, on nutritional intake and weight, for elderly patients on an acute medicine for the elderly ward</p>	<p>study using two different comparison groups</p> <p><b>Duration of study</b> February to March 2004 over 6 weeks</p>	<p>Intervention (n=30) Control (n=18)</p> <p><b>Settings</b> Two medicine for the elderly acute wards</p> <p><b>Age (years)</b> Median age =84 No further detail reported</p> <p><b>Gender</b> No detail reported</p> <p><b>Reasons for admission</b> No detail reported</p>	<p>attend every lunchtime during weekdays. A trained nursing assistant supervised the dining room and offered encouragement and support to patients as required</p> <p><b>Control</b> The patients on the second ward ate only by their bedside and acted as controls. Nursing assistants were available as part of normal ward routine to assist all patients at mealtimes</p> <p><i>Definition of mealtimes</i> Lunchtimes on weekdays</p> <p><i>Definition of feeding assistance</i> Encouragement and support</p> <p><i>Selection of patients</i> A daily list of patients potentially able to attend the dining room based on their medical condition and rehabilitation potential was developed for both wards between the physiotherapists and the nursing staff. From this, patients from the intervention ward were encouraged to attend whilst the other ward's potential candidates were used as the control group eating by their bedside</p>	<p>Protein (g)</p> <p><i>Nutritional Status</i> Weight gain</p> <p><i>Food intake</i> Measured by a food record chart. No further details reported</p> <p><i>Nutritional analysis</i> Dietplan5</p>
<p><b>Young et al. 2011<sup>34</sup></b> Australia</p> <p>To implement and compare three interventions designed to specifically address mealtime barriers in older medical patients,</p>	<p><b>Study design</b> Before and after study</p> <p><b>Duration of study</b> Pre intervention data – November 2007 to March 2008  Post intervention data</p>	<p><b>Participants</b> Patients Pre-intervention (n=115)</p> <p>Post-intervention (n=139) - Intervention 1 (n=39) - Intervention 2 (n= 58) - Intervention 3 (n= 42)</p>	<p><b>Intervention</b> <b>Intervention 1: Protected mealtimes (n=39)</b> No change in staffing levels Strategies negotiated with clinicians -Limit non-urgent activities and interruptions at mealtimes - re-prioritise clinical activities to focus on meals at mealtimes</p>	<p><b>Outcome measures</b> <b>Primary:</b> Daily energy intake Daily protein intake</p> <p><b>Secondary outcomes</b> Uptake mealtime assistance Interruptions</p>

<p>with the primary objective of improving energy and protein intakes of elderly medical inpatients in the first week of their acute hospital admission</p>	<p>– January to June 2009</p>	<p><b>Setting</b> Three Internal Medicine wards</p> <p><b>Age (years)</b> Pre Intervention: 79.4<math>\pm</math>7.9 Post intervention: 80.2<math>\pm</math>8.1</p> <p><b>Gender</b> Pre Intervention Females 58 (51%) Post intervention Females 76 (55%)</p> <p><b>Reason for admission</b> <i>Pre Intervention</i> Infection 23 (20%) Chronic cardio-respiratory 30 (26%) Neurological disease 9 (8%) Fall/fracture 11 (10%) Gastro-intestinal 13 (11%) Cancer 9(8%) Other 20 (17%)</p> <p>Cognitive impairment 14 (12%)</p> <p><b>Post Intervention</b> Infection 38 (28%) Chronic cardio-respiratory 14 (10%) Neurological disease 20 (14%) Fall/fracture 15 (11%)</p>	<p>- all members of multidisciplinary teams to encourage and assist patients with nutritional intake</p> <ul style="list-style-type: none"> <li>- rearrange nursing breaks to maximise patient assistance</li> <li>- request non-urgent procedures and ward transfers to be scheduled outside mealtimes</li> </ul> <p>Ward dietitian to provide early nutrition support <i>Training</i> - 25 hours</p> <p><b>Intervention 2: Additional assistant in nursing</b> One additional assistant in nursing staff member employed per ward to</p> <ul style="list-style-type: none"> <li>-assist patients with meals and between meal snacks</li> <li>- assist with ordering and encouraging high energy and high protein options</li> <li>- document intake</li> <li>- liaise with other staff re patient barriers to nutritional intake</li> </ul> <p>Ward dietitian to provide early nutrition support <i>Training</i> - 15 hours additional assistant in nursing, 6 hrs nursing staff</p> <p><b>Intervention 3: Intervention 1 and 2 combined</b></p> <p><i>Definition of mealtimes</i> Observed on a single day between day 3 and day 7 of admission across breakfast, lunch and dinner</p>	<p><b>Food intake</b> Visual estimation of plate waste. Consumption was estimated (none, 1/8, 1/4, 1/2, 3/4, all) for each component of the meal (e.g.soup, meat, potato, green vegetables, bread). Mid-meal intake was estimated by observation and/or patient recall</p> <p><b>Nutritional analysis</b> FoodWorks Professional nutrient analysis software</p>
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		<p>Gastro-intestinal 7 (5%) Cancer 8 (6%) Other 36 (26%)</p> <p>Cognitive impairment 43 (31%)</p>	<p><i>Definition of feeding assistance</i> pre meal set up, encouragement, full feeding assistance</p> <p><i>Selection of patients</i> Consecutive patients who had a hospital stay of more than 2 days and were admitted from the emergency department 65 years or older Participants were allocated to one of three intervention wards based on the ward to which they were admitted. Each intervention was allocated to medical wards based on which intervention the nursing managers felt would be most effective and easily implemented on their ward.</p>	
<p><b>Duncan et al. 2006<sup>31</sup></b> UK</p> <p>To examine how improved attention to nutritional status and dietary intake, achieved through the employment of dietetic assistants, will affect postoperative clinical outcome among elderly women with hip fracture</p>	<p><b>Study design</b> Randomized Controlled Trial</p> <p>Block randomization</p> <p><b>Duration of study</b> Three years May 2000 to August 2003</p>	<p><b>Participants</b> Patients (n=318) Intervention: (n=153) Control (n=165)</p> <p><b>Setting</b> Acute trauma ward</p> <p><b>Age (years)</b> Over 65 years No further details reported</p> <p><b>Gender</b> All female</p> <p><b>Reason for admission</b> Acute non pathological hip</p>	<p><b>Intervention</b> Nutrition support provided by two dietetic assistants</p> <p><b>Control</b> Usual care (conventional nursing and dietitian-led care which included the provision of oral nutritional supplements)</p> <p><i>Training</i> Training provided 14 days</p> <p><i>Definition of mealtimes</i> Dietetic assistants on ward 6 hours a day / 7 days a week</p> <p><i>Definition of feeding assistance</i></p>	<p><b>Primary outcome measure:</b> Post-operative mortality</p> <p><b>Secondary outcome measures</b> Inpatient and 4 month mortality Length of stay Complication rate Energy intake (Kcal)</p> <p><i>Nutritional status</i> Hb(g/dl), lymphocyte count(<math>\times 10^9/l</math>) Serum albumin(g/l) Weight(kg), MAC(cm), TST(mm),</p>

		fracture (100%)	<p>Feeding assistance as part of this which involved sitting with, encouraging and feeding the frailest patients. Assisting with food choice, portion size and positioning at mealtimes. Provision of appropriate feeding aids</p> <p><i>Selection of patients</i> All women over the age of 65 presenting to a single trauma ward with acute non-pathological hip fracture, between May 2000 and August 2003 were approached (n=318/333) agreed to participate</p>	<p>Handgrip strength(Nm)</p> <p><i>Food intake</i> On third post-operative day descriptions of portion sizes. Validated using a 3 day weighed food intake on days 3–6 after operation in a subset of 27 consecutive admissions over a 4 month period</p> <p><i>Nutritional analysis</i> Not stated</p>
<p><b>Roberts et al. 2014<sup>41</sup></b> UK</p> <p>To determine the feasibility and acceptability of using trained volunteers as mealtime assistants for older hospital inpatients</p>	<p><b>Study design</b> Southampton mealtime assistance study</p> <p><b>Duration of study</b> For 1 year from 1<sup>st</sup> Dec 2011 to January 31<sup>st</sup> 2012</p> <p><b>Qualitative data collection</b> Focus groups with volunteers (n=4) Focus groups with patients and staff (n=2) Semi-structured interviews with patients and staff</p> <p><b>Quantitative data</b></p>	<p><b>Participants</b></p> <p><b>Qualitative component</b> Volunteers (n=12) Patients (n=9) Staff (n=17)</p> <p><b>Quantitative component</b> Volunteers (n=29)</p> <p><b>Setting</b> Acute female medical ward for older people</p> <p><b>Age (years)</b> Aged 70 years and over</p> <p><b>Gender</b> Female n=9 (100%)</p> <p><b>Reasons for admission</b> No details reported</p>	<p><b>Intervention</b> Volunteer mealtime assistance</p> <p><i>Training</i> Volunteers trained Half day</p> <p><i>Definition of mealtimes</i> Each weekday lunchtime</p> <p><i>Definition of feeding assistance</i> Included encouragement to eat, support with opening packets and setting up the meal tray, cutting up food, helping guide the food to the patient's mouth and actually feeding patients.</p> <p><i>Selection of patients</i> Unselected female emergency admissions</p>	<p><b>Quantitative component</b> Feasibility Of delivering mealtime assistance over 1 year.</p> <p>Descriptive statistics</p> <p><b>Qualitative component</b> Acceptability Experiences of recruitment and training, and the role of the mealtime assistant Staff and patient perceptions of the role of volunteers</p> <p>Framework analysis</p>

	<b>collection</b> Delivery and content of training programme and the mealtime activity of the volunteers along with any adverse events associated with feeding patients			
<b>Robison et al. 2015<sup>25</sup></b> UK  To obtain multiple perspectives on nutritional care of older inpatients, acceptability of trained volunteers and identify important elements of their assistance	<b>Study design</b> Mixed methods evaluation  Southampton Mealtime assistance study  <b>Duration of study</b> For 1 year from 1 <sup>st</sup> Dec 2011 to January 31 <sup>st</sup> 2012  <b>Qualitative data collection</b> Focus groups (n=3) Semi-structured interviews Conducted 1 year before and after introduction of trained volunteer mealtime assistants (weekday lunchtimes) on one ward and parallel comparison with a control ward	<b>Participants</b> <i>Interviews</i> Baseline year Patients (n=10) Relatives (n=5) Staff (n=9)  Intervention year Patients (n=15) Relatives (n=5) Staff (n=11)  <i>Focus Groups</i> Volunteers (n=12)  All other details see Roberts et al 2014	<b>Intervention</b> Volunteer mealtime assistance  For further details see See Roberts et al 2014	Experience and views of nutritional care of older inpatients from multiple perspectives

	<b>Analysis</b> Framework analysis			
<b>Walton et al. 2013<sup>42</sup></b> Australia  The aim of this study was to identify environmental factors that were associated with achieving adequate food consumption in a hospital context	<b>Study design</b> Mixed methods  <b>Duration of study</b> 3 month period during late 2004  <b>Quantitative component</b> Questionnaires completed through patient (n=11) Interviews and staff (n=11) structured interviews  <b>Qualitative component</b> Overt observations in each location were undertaken over 2 days	<b>Participants</b> <b>Quantitative component</b> Patients (n=11) Nurses (n=10) Doctor (n=1)  <b>Qualitative component</b> Patients (n=33)  <b>Setting</b> Rehabilitation wards in three hospitals  <b>Age (years)</b> Mean 79.2±9.2  <b>Gender</b> Female n=16, (53%)  <b>Reasons for admission</b> Most common reasons for admission were cerebrovascular accident or a fracture	<b>No intervention</b>  Factors affected food consumption  <i>Definition of mealtimes</i> Commencing prior to the breakfast service and concluding after the supper service each day  <b>Selection of patients</b> Purposive sampling with the Nurse Unit Manager or delegate on each ward inviting patients within a shared room of four or five beds to participate	The questions covered access to food between meals, barriers to food intake, time available for eating, assistance to eat, food quality, food brought by relatives and friends, and overall satisfaction with the food services provided  <b>Quantitative component</b> Descriptive statistics  <b>Quantitative component</b> Content and thematic analysis
<b>Tsang 2008<sup>10</sup></b> Australia  To observe patients at mealtimes in order to determine the amount of assistance needed by	<b>Study design</b> Observational study (case series)  <b>Duration of study</b>	<b>Participants</b> 46/67 patients admitted during study period  <b>Setting</b> One geriatric ward	<b>No intervention</b>  <i>Definition of mealtimes</i> Observed for one day at all meals (breakfast, lunch, dinner and snacks)	Amount and type of food eaten. Visually measured and recorded in quartiles  Adequacy of eating assistance assessed by

each patient and the time taken to provide this assistance	Over 1 week	<p><b>Age (years)</b> Mean age 86.5 (SD 4.8)</p> <p><b>Gender</b> Females n=28 (61%)</p> <p><b>Reasons for admission</b> No details reported</p>	<p><i>Definition of feeding assistance</i> Total independence - Patient requires no assistance from nursing staff after receiving tray Partial dependence - Self-feeding is demonstrated but requires help with tasks. This includes patients who try to eat independently, patients who response to verbal instruction and patients who need physical guidance such as tray setup and positioning. Total dependence - An inability to self-feed was demonstrated. Patient required intensive levels of physical assistance and/or verbal guidance to be able to eat</p> <p><i>Selection of patients</i> All patients admitted to the ward were considered for inclusion</p>	observing: -Patients eating behaviours, type of eating assistance and percentage of patients receiving feeding assistance, staff time spent providing feeding assistance, caregivers providing feeding assistance per meal, time patients required to finish meal and tray access time and meal duration
<p><b>Walton et al. 2012</b><sup>33</sup> Australia</p> <p>To explore current practices of food service provision in Australian hospitals</p>	<p><b>Study design</b> Cross Sectional Survey</p> <p>Web-based questionnaire</p> <p><b>Duration of study</b> 2005 Australian Hospitals Directory</p>	<p><b>Participants</b> Dietitians (n=92) Food Service Managers (n=58) Nurse Unit Managers (n=68)</p> <p><b>Settings</b> 184/615 eligible hospitals with longer stay elderly patients</p>	<b>No intervention</b>	<p>Current practices</p> <p>Perceived barriers</p> <p>Priority opportunities to enhance nutrition support</p>
<p><b>Dube et al. 2007</b><sup>29</sup> Canada</p> <p>To examine the nutritional implications of the interactions taking</p>	<p><b>Study design</b> Repeated measures design (within-subject naturalistic study) Observational study</p>	<p><b>Participants</b> Patients (n=32)</p> <p><b>Settings</b> Dining room of a geriatric rehabilitation unit</p>	<p><b>No intervention</b></p> <p><i>Definition of mealtimes</i> Participants were under observation three meals a day (breakfast, midday and evening meals), every other day (week-</p>	<p><b>Outcomes assessed</b> Energy intake (Kcal) Protein intake (g)</p> <p>Control variables :</p>



place between patients and care providers during mealtimes in hospital settings	<b>Duration of study</b> Over an 18 month period	<b>Age (years)</b> Mean 78.8 65-79 (53%) / Over 80 (47%)  <b>Gender</b> Females n=21 (66%)  <b>Reasons for admission</b> Stroke n=17 (53%) Fracture n=7 (22%) Deconditioning n=8 (25%)	ends and holidays included) until their discharge or for a maximum of 6 weeks, for a final sample size of 1477 meals (average number of meals per participant: 46.2, 95% CI: 40.9, 51.4)  <i>Definition of feeding assistance</i> A team of care providers comprising mostly nurses and orderlies was present during the meal to perform meal service and promote meal assistance No further details provided  <i>Selection of patients</i> 167 /355 eligible patients admitted to the unit over the 18-month study period  83 patients invited, 37 agreed to participate (45%). 32 completed	Level of hunger Meal duration  <i>Food intake</i> Visual estimation of the proportion of the serving that remained as plate leftover for each meal component, using the Comstock scale  <i>Nutritional analysis</i> NutriWatch Nutrient Analysis program (v.6.1.5F)
<b>Paquet et al. 2009</b> <sup>30</sup> Canada  To evaluate the social facilitation of elderly patients' food intake beyond the presence of mealtime companions by assessing various relationships	See Dube et al. 2007 <sup>29</sup>	See Dube et al. 2007 <sup>29</sup>	See Dube et al. 2007 <sup>29</sup>  Dining room All participants were assigned to one of six tables, where they ate all their meals in the company of up to three fellow patients.	<b>Outcomes assessed</b> Energy intake (Kcal) Protein intake (g) Weight gain  "we performed similar analyses with protein intake and we found similar results, we present only the results for energy intake" pg 607
<b>Manning et al. 2012</b> <sup>40</sup> Australia  To evaluate the effectiveness of the volunteer feeding assistance program at improving patients' food	<b>Study Design</b> Mixed methods - Single group case series - Descriptive survey with volunteers and nurses - Interviews with	<b>Participants</b> Elderly patients (n=23) acted as their own controls for other meals  Volunteers (n=10) Nurses (n=15)	<b>Intervention</b> Volunteer feeding assistance Meal tray set up, opening packets, feeding encouragements and conversation.  <b>Control</b> Usual care	<b>Outcomes assessed</b> Protein intake (g) Energy intake (KJ) % meeting nutritional requirements  Experiences of volunteers,

<p>intakes and to identify its role within a hospital setting</p> <p>To evaluate the role and importance of the program within the hospital setting through observations and obtaining the opinion of nurses and volunteers</p>	<p>patients</p> <p>Convenience sample</p> <p><b>Duration of study</b> Three collection periods in September and October 2009 and two in February 2010</p>	<p><b>Setting</b> Two aged care wards</p> <p><b>Age (years)</b> Mean <math>83.2 \pm 8.9</math> range 67-97 years</p> <p><b>Gender</b> Females: n=17 (74%)</p> <p><b>Reasons for admission</b> Injury or fracture from a fall (35%), Pneumonia (13%) Leg ulcer complications (13%) Pain (9%) Miscellaneous (30%)</p>	<p>No volunteer feeding assistance</p> <p><i>Training</i> Volunteers trained Duration of training not specified</p> <p><i>Definition of mealtimes</i> Lunchtimes on weekdays</p> <p><i>Definition of feeding assistance</i> Feeding, opening packages, tray set up, encouragement and/or social support at mealtimes.</p> <p><i>Selection of patients</i> Patients needed assistance were referred to the program by the Nurse Unit Manager or Clinical Care Coordinator</p>	<p>nurses and patients in relation to feeding assistance</p> <p><i>Food intake</i> Uneaten food was weighed and compared to duplicate samples of meals to determine standard serving size. Electronic scales used to weigh plate waste.</p> <p><i>Nutritional analysis</i> Xyris Software</p>
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Key: BMI – Body mass index; Hb – haemoglobin; MAD – Mid arm circumference, MAMC - Mid arm muscle circumference; TSFT - triceps skinfold thickness

Study, Country, Aim	Methods	Participants details , Setting	Phenomena of interest
<b>Ross et al. 2011</b> <sup>37</sup> Australia  To explore staffs' knowledge, attitudes and behaviours in relation to hospital care	<b>Study design</b> Qualitative Purposive sample  Focus groups (n=3)  <b>Duration of study</b> Not reported  <b>Analysis</b> Framework analysis	<b>Participants</b> Dietitian (n=3) / Speech pathologist (n=2) Occupational therapist (n=3) / Pharmacist (n=1) Physiotherapist (n=2) / Dietetic assistant (n=2) Nurse (n=9)  <b>Setting</b> Four Internal medicine wards with patients >65 years	Knowledge, attitudes and behaviour in relation to hospital nutrition
<b>Naithani et al. 2008</b> <sup>36</sup> UK  To examine in-patients' experiences of access to food in hospitals	<b>Study design</b> Qualitative  Semi-structured interviews  Informal observation of mealtimes (n=32) Lunch service was main focus although breakfast and evening meals were observed  <b>Duration of study</b> Not reported  <b>Analysis</b> Thematic analysis	<b>Participants</b> Patients (n=48)  <b>Setting</b> 8 acute wards (cancer, renal, surgical, elderly care, stroke, orthopaedics, acute and general medicine) from two hospitals  <b>Age (years)</b> Age 25-88 (23 over 65 years)  <b>Gender</b> Female n=28 (58%)  <b>Reasons for admission</b> Details not reported	Experiences of access to food in hospitals  Perception of food, perceived dietary requirements, eating experience at mealtime, standard and acceptability of food and service, systems for food delivery and mealtimes, problems with hospital food and role of visitors
<b>Dickinson et al. 2008</b> <sup>39</sup>	<b>Study design</b>	<b>Participants</b>	Phase 1: Mealtime experience

<p>UK</p> <p>To improve the mealtime experience of older people in a hospital setting through helping staff to make changes to their clinical practice and the ward environment</p>	<p>Action research</p> <p>Phase I Observations mealtimes (n=6) breakfast, lunch and supper) Staff Focus groups (n=3) Interviews (n=10) Relatives comments box</p> <p>Phase II Data from phase 1 fed back to staff and used to form an action plan to develop a patient centred approach to mealtimes</p> <p>Phase III Staff Focus groups (n3) Patient interviews (n=4) Purposive sample</p> <p><b>Duration of study</b> April 2004 – September 2005</p> <p><b>Analysis</b> Interpretative inductive approach</p>	<p>Phase 1: Staff (n=19) / Patients (n=10) Phase 3: Staff (n=21) / Patients (n=4)</p> <p><b>Settings</b> Twenty-six-bed unit providing care for older patients with complex discharge needs.</p> <p><b>Age (years)</b> Older patients over 65 years Further details not reported</p> <p><b>Gender</b> No details reported</p> <p><b>Reasons for admission</b> No details reported</p>	<p>Phase III: : Factors contributing to assessment and monitoring of the nutritional intake and nutritional status of patients:</p>
<p><b>Heaven et al. 2013<sup>35</sup></b> UK</p> <p>To understand and describe processes that promote or inhibit nutrition in hospital</p>	<p><b>Study design</b> Qualitative</p> <p>Focus group (n=1) Interviews (n=53)</p> <p><b>Duration of study</b></p>	<p><b>Participants</b> <i>Focus groups:</i> Former patients (n=2) / Carers (n=3)</p> <p><i>Interviews</i> Catering staff (n=9) Senior clinical staff (n=19)</p>	<p>Processes that promote or inhibit nutrition in hospital</p>

	<p>Not reported</p> <p><b>Analysis</b> Constant comparison analysis Normalisation process theory</p>	<p>Frontline ward staff (n=10) Professionals allied to medicine (n=9) Stakeholder representatives (n=6)</p> <p><b>Setting</b> Four hospitals across three NHS Trusts for older patients &gt;65 years</p>	
<p><b>Walton et al. 2006</b><sup>38</sup> Australia</p> <p>To elicit concerns of key stakeholders regarding food service provision to long stay hospital patients</p>	<p><b>Study design</b> Qualitative</p> <p>Focus group (n=17) Interviews (n=4)</p> <p><b>Duration of study</b> Between September 2003 and December 2004</p> <p><b>Analysis</b> Combination of content and thematic analysis</p>	<p><b>Participants</b> Stakeholders working with long stay patients (n=98) Nurses (n=19), Patients (n=14), Dietitians (n=20), Nutrition assistants (n=11), Food service managers (n=13), Food service assistants (n=18), Other health care staff (n=3)</p> <p><b>Setting</b> Public and private hospitals</p>	<p>Question What do you think about the meal service in hospitals</p>

**Appendix XI: Included quantitative studies by JBI Levels of Evidence**

<b>JBI Levels of Evidence</b>	<b>Effectiveness</b>	<b>Number of Included Studies</b>	<b>Citation</b>
<b>Level 1</b> Experimental Designs	1.a – Systematic review of Randomized Controlled Trials (RCTs)	--	Hickson et al. 2004, Duncan et al. 2006
	1.b – Systematic review of RCTs and other study designs	--	
	1.c – RCT	2	
	1.d – Pseudo-RCTs	--	
<b>Level 2</b> Quasi-experimental Designs	2.a – Systematic review of quasi-experimental studies	--	Wright et al. 2006, Robinson et al. 2002
	2.b – Systematic review of quasi-experimental and other lower study designs	--	
	2.c – Quasi-experimental prospectively controlled study	2	
	2.d – Pre-test – post-test or historic/retrospective control group study	2	
<b>Level 3</b> Observational – Analytic Designs	3.a – Systematic review of comparable cohort studies	--	Manning et al. 2012, Walton et al. 2008 Dube et al. 2007/ Paquet et al. 2009
	3.b – Systematic review of comparable cohort and other lower study designs	--	
	3.c – Cohort study with control group	--	
	3.d – Case – controlled study	2	
	3.e – Observational study without a control group	1	
<b>Level 4</b> Observational – Descriptive Studies	4.a – Systematic review of descriptive studies	--	Walton et al. 2013, Walton et al. 2012 Tsang 2008, Buys et al. 2013, Roberts et al. 2014 / Robison et al. 2015
	4.b – Cross-sectional study	2	
	4.c – Case series	3	
	4.d – Case study	--	
<b>Level 5</b> Expert Opinion and Bench Research	5.a – Systematic review of expert opinion	--	
	5.b – Expert consensus	--	
	5.c - Bench research/ single expert opinion	--	

## Appendix XII: Extracted qualitative findings

### Paper 1: Walton et al. 2013<sup>42</sup>

This study identified environmental factors associated with achieving adequate food consumption in a rehabilitation context. A combination of content and thematic analysis was used to identify key topics from the observations of patients and staff at mealtimes. Questionnaire based interviews were also administered which included patients and staff, these are reported in the quantitative section of this review.

**Finding 1:** Bedside was the most common eating location but dining rooms were utilised for mobile older patients (>65 years) at lunch and tea time. (U)

Illustration 1: "Sitting out of bed. There is no conversation in the room, apart from patient 3 talking with the researcher, after she says hello". p.18<sup>42</sup>

Illustration 2: "Breakfast tray arrives. Patient sits on side of bed to eat breakfast, with tray table in front. Nurse assisting with patient's eating position and tray". p.18<sup>42</sup>

Illustration 3: "Patient is now sitting out at the dining table with other patients and their visitors. The television is off, but the music is still playing. Nurse gives patient a bib for dinner". p.18<sup>42</sup>

**Finding 2:** Assistance at meals was provided by staff to older patients (>65 years) especially with regard to opening packages. (U)

Illustration 1: "Nursing assistance: Lunch is delivered: The tray is delivered by a nurse, who says hello, moves the tray table closer, takes off the lids, butters bread and puts the straws into drinks". p.18<sup>42</sup>

Illustration 2: Food service assistance: Food Service Assistant adjusts the tray table and moves it closer to patient 2, who is sitting out in a chair with a bib on. She assists patient to open his milk container before leaving the room. She and he discuss the difficulty of opening some packages. p.18<sup>42</sup>

**Finding 3:** Additional assistance for older patients (>65 years) was provided by relatives and seen as a positive interruption. (U)

Illustration 1: Daughter has arrived and is assisting with eating, opening food items, for example salt and pepper. p.18<sup>42</sup>

Illustration: "Relative of another patient is assisting the patient with eating (cutting up food)". p.18<sup>42</sup>

**Finding 4:** Social interaction with older patients (>65 years) at mealtimes can be positive. (U)

Illustration 1: This patient also promotes social interaction with older patients (>65 years) which facilitates consumption in other patients. p.18<sup>42</sup>

**Finding 5:** Allied health rounds create interaction with older patients (>65 years) and can be positive. (U)

Illustration: Dietitian enters the room and sees how each of the patients are going with their meal. She asks each patient about their meal. She encourages the patient to finish his Resource Plus after lunch. p.18<sup>42</sup>

**Finding 6:** Ward routines had a negative impact on mealtimes for older patients (>65 years). (U)

Illustration1: The medication nurse is making rounds and taking blood when the morning tea is being served. p.18<sup>42</sup>

Illustration 2: Lunch has just arrived and stretcher transfer has arrived to take patient off to an X-ray. p.18<sup>42</sup>

Illustration 3: She is seated, when the lunch meal is sat in front of her. She begins immediately. Requests a glass of milk instead of tea/coffee and receives it. Doctor asks "how are you going?" She explains she still feels some pain. Doctor consult whilst still eating meal. He explains the x-rays and explains that everything will be fine. p.18<sup>42</sup>

Illustration 4: Lunch is delivered. . . Patient doesn't need assistance and commences straight away. Physiotherapist visits patient and talks with him about home exercises and walking for about a minute. . . . . Occupational Therapist visits to confirm that his wife is picking up equipment for home. He has little more of the meal. p.18<sup>42</sup>

## **Paper 2: Dickinson et al. 2008<sup>39</sup>**

This study used an action research design drawing in techniques from practice development to support the action phase. The aim was to improve the mealtime experience of older people in a hospital setting through helping staff to make changes to their clinical practice and the ward environment.

Data collection included observation of six mealtimes and focus groups with members of multi-disciplinary staff working on the ward. Three focus groups including 19 staff were undertaken in phase 1-looking and 15 staff in phase 3-evaluation of change. Phase 2 involved thinking and acting, findings were presented to staff and action learning sets and facilitated learning used to identify issues, plan solutions and evaluate change. The findings are presented in relation to phase 1 and phase 3.

**Phase 1:** At the start of the action research cycle, mealtime care operated in a routinized and ritualistic way with little thought about the appropriateness or effectiveness of this style of practice. Mealtime care was provided mainly by unqualified staff while qualified nurses focused on tasks such as administering drugs and completing paperwork. Nurses were mostly unaware of their roles and responsibilities for the nutritional care of the patients and patients were passive recipients of care. Many of the nursing staff had been working on the ward for several years and had very little exposure to education and some were very entrenched in their ways of practice.

**Finding 7:** Qualified staff were often involved in other tasks during the mealtime and, therefore, unavailable to provide care to older patients (>65 years). (U)

Illustration: Some people don't feel it's their job to help during dinner time, so I suppose if staff can prioritise their work that would help at lot. (Focus group 2) p.1496<sup>39</sup>

**Finding 8:** Older patients (>65 years) were aware of the limited number of staff available to provide help at mealtimes. (U)

Illustration 1: Well if it's available but if you haven't got it, you can't have it can you? When there's so many to look after. p.1496<sup>39</sup>

**Finding 9:** Relatives commented on the lack of attention to older patients' (>65 years) needs with food sometimes being out of reach. (U)

Illustration: Nice for patients to have meals at table in day room, although sometimes food is out of patients reach. (relative-comment box) p.1496<sup>39</sup>

**Phase 3:** Major changes to mealtime care were made, this included changing the time of the evening drug round. Previously, mealtimes were described as chaotic and something to be avoided if at all possible.

**Finding 10:** Mealtimes were considered enjoyable following staff reflection and action learning on the process. (U)

Illustration: Wonderful! (Laughter) It's amazing now actually, it's quite an enjoyable thing to...quite enjoyable now at mealtime because it's no longer considered as a task, which means that it is



something that everybody's looking forward to, the staff and patients wise actually. (Focus group 5) p.1497<sup>39</sup>

**Finding 11:** Changes made to nursing practice meant that qualified nurses were available to assist in mealtime care, this had a positive effect on both older patients' (>65 years) and staff mealtime experience. (U)

Illustration 1: I've suddenly remembered... I've had a flashback!...now I've remembered... you were running round like a maniac trying to get six hundred things done at the same time... and getting all stressed out by it as well. (Focus group 4) p.1498<sup>39</sup>

Illustration 2: More people are available to help patients. It's a priority. That's what everybody's doing now rather than writing notes and...the drug round and things like that that used to go on before. p.1498<sup>39</sup>

Illustration 3: At times where there's something I can't cut, a nurse will help you cut but if I can manage all right myself, I don't bother anybody. (Patient 9) p.1498<sup>39</sup>

Illustration 4: Well I think it's nice to know that you're, I mean, absolutely waited on, I'm not used to being waited on so it's lovely to have it put in front of me. (Patient 7) p 1498<sup>39</sup>

**Finding 12:** Getting to know the older patients (>65 years) and taking the time to provide what was needed for individual patients' assessment emerged as a new aspect to assessment. (U)

Illustration 1: HCA ...I'm feeding her now and sometimes by holding her hand so she can't push it away and I actually fed her everything the other night. She was quite happy to hold my hand, she didn't push me away so I found that quite easy to be able to do it that way. It doesn't always work but...

RN But she's put on a lot of weight as well...

RN Three [kilograms] I think it was ...

HCA Well you just try different things, don't you? I mean if she spat it out then I wouldn't pursue feeding her but I found that if I held her hand if she wanted to squeeze it she could squeeze it but if I didn't hold her hand she would put it to her mouth and then she would start pushing away but she didn't, I wasn't force feeding her...but she took the food. (Focus group 6) p.1499<sup>39</sup>

Illustration 2: I've had a bad mouth ...and it's made my mouth very sore inside so I have to keep asking them for something soft and every day they try to get me something soft ... very pleased with that. That they were still looking after me so well. (Patient 9) p.1500<sup>39</sup>

Illustration 3: And there's also about the duration of feeding ... if you sit and be patient and have the time to do it, then that person will actually eat. (Focus group 4) p.1500<sup>39</sup>

**Finding 13:** Working with older patients' (>65 years) families, learning strategies from them and communicating these to the rest of the team was important. (U)

Illustration 1: I think a lot of that came actually from the family, their suggestions as to what she would eat and the way they'd do it. I observed that and I found it actually works because they get the drink and they say "come on, that's lovely, that's lovely" and, you know and when you try and do that, how her son does it, she'll take the whole drink. (Focus group 6) p.1500<sup>39</sup>

**Finding 14:** Staff able to prioritize nutritional care and be actively involved in mealtimes. They were then in a position to observe and monitor what older patients (>65 years) were eating and any difficulties they were experiencing. (U)

Illustration: It's a priority now, I think isn't it? Seeing what people eat, it's like one of the most important.... I don't think I recognised how important it is that the eating thing, because everything else kind of goes from that, doesn't it. (Focus group 6) p.1500<sup>39</sup>

### Paper 3: Heaven et al. 2013<sup>35</sup>

This study was undertaken as part of a wider research study, the Multidisciplinary Approach to Addressing Malnutrition in hospital (MAPPMAL study). The aim was to examine provision of food services at four UK hospital sites across two regional locations focusing on older patients admitted with dementia, stroke or fractured neck of femur. Data were collected through semi-structured interviews with National Health service staff (n=54), stakeholders (n=6) and a focus group with former patients and carers (n=5).

**Finding 15:** Food work in hospital requires staff to follow procedures and all staff engaging in serving meals should be able to complete these routines but also involve taking the initiative and understanding the older patients' (>65 years) perspective and to empathically assist when necessary. (U)

Illustration 1: The last people that we normally go to are the people that need feeding. And again [we] don't dish anything out until we're ready to feed them...make sure they're in a good sitting position...serviettes, following the protocol as to what they're allowed to have and what they're not allowed to have...[then]...see if they want their faces wiped... document on their food chart what they've eaten, what they haven't eaten, what they've drunk or haven't drunk. (Health care assistant 1, rehab, region 2) p. 631<sup>35</sup>

Illustration 2: My way of thinking is...check that the meal is what they requested, they may not remember they requested it, they may not like what they've got, can see if we can do a little juggling around...or if they're not hungry just try to encourage them...sometimes with an elderly person it makes an awful lot of difference because just the sight of a huge big dinner, they won't touch it. So...I tend to say 'well how about I take some off, make it a little bit smaller'?...Glasses can be a factor as well. I know that sounds silly but...they like to have their glasses on to see what they're eating. (Health care assistant 1, rehab, region 2) p.631/2<sup>35</sup>

Illustration 3: HCA1 made a subtle distinction between what she and other staff were formally asked to do in the performance of their role and what she chose to do, based on her experience of working with older patients; her 'way of thinking'. This included taking the initiative to assist patients in accessing food at the bedside, rather than simply transferring food between the trolley and bedside table, eliciting – and acting on – patients' needs and finding ways to meet individual preferences in a catering system designed for a high throughput and advance ordered meals. p.632<sup>35</sup>

Illustration 4: [O]ften on these wards, elderly people are very frail and they are very anxious...[there are] those that crop up who aren't eating very much, they're losing weight, they've got all sorts of signs that nobody can quite put their finger on, and when you actually stop and give them some time, and talk to them, you find that a lot of the issues are based around anxiety...you've got lots of elderly people...who don't drink enough...because they are worried...they are not going to be [assisted] go to the loo...or they've had a choking bout in the past, it's never really been addressed properly and...it's embedded itself psychologically...but it's needing the time to be able to spend with those particular people and give [them] the reassurance they need. (Speech and language therapist, elderly care, region 2) p.632<sup>35</sup>

**Finding 16:** Feeding assistance was often a key topic in the accounts of older patients (>65 years) and carers when discussing the problem of malnutrition in hospital. (U)

Illustration 1: [T]he care, [is] not there and I've always believed that the two important things, particularly with people with dementia is that they retain their dignity and they have the respect and I'm afraid in hospital that did not occur. Er, feeding wise...I asked one of the nurses and they said [my wife] refused [food]...as [if] to say 'Well we haven't the time to do it'. Quite honestly I believe that is a situation that has developed over the years, that the staff don't have that time as individuals as I would have at home to...see that she did eat. (Carer 2) p.633<sup>35</sup>

Illustration 2: I firmly believe it's not so much the food...but in the majority of cases...it's the fact that the staff either don't have the time or can't be bothered to make sure that people who can't feed themselves...get looked after...I would apportion probably 80% of the reason why elderly people...lose weight is because...they are incapable of feeding themselves. (Carer 3, stroke) p.633<sup>35</sup>

Illustration 3: [The food] was never close enough...and if I couldn't reach it nobody else tried to give me it...it takes nothing for them to think about what they are doing...it takes a little time, okay to stand by them or sit by them and give them the food, but they don't try... whether it's [the amount of work]...or whether it's just not taught...[or] that they don't ...give it credence that something as simple as that could be the reason that the person in the bed isn't eating...and if [patients] are encouraged to...eat it then they would. (Patient 2, stroke) p.633<sup>35</sup>

Illustration 4: Can I just add?...when I used to visit my mother [in hospital]...my Dad would say 'Oh they said they helped her with her food today' which suggests that they didn't always help her with her food and you're talking about [how] they are considering building new hospitals and how you could provide better food. (Carer 1, dementia) p.633<sup>35</sup>

**Finding 17:** Hospital staff identified a range of barriers to effective feeding of older patients (>65 years), including limited time and staff numbers, competing priorities or conflicting policies and issues regarding needs of particular patient groups. (U)

Illustration 1: It can be very time consuming sitting with patients encouraging them to eat, helping them, assisting them...what you have then is the problem that the food can go cold if they're taking a long time to eat, and obviously under those circumstances the texture of the food changes, the likelihood that patients are going to finish the meal is probably going to be reduced. (Dietitian, region 2) p.634<sup>35</sup>

Illustration 2: [Patients' will] say 'I want the toilet' and you know it's the policy of the Trust they're supposed to go to the toilet beforehand...but how do you tell somebody who's got dementia they can't go to the toilet with only one person? So apart from feeding we're taking them to the toilet. (Nurse 1, fractures, region 1) p.634<sup>35</sup>

Illustration 3: Someone complained that the toast was cold. Because you just make a big batch of toast (Health care assistant 3, fractures, region 1) p.634<sup>35</sup>

Illustration 4:...[but] the nurses are doing the tablets...writing all the things down for people going to theatre...you're asking [for the patients] to be pulled up the bed, and then there's somebody else sat on the toilet and you're trying to keep the toast hot by wrapping it up. (Nurse 1, fractures, region 1) p.634<sup>35</sup>

**Finding 18:** Ward-based staff identified two older patients (>65 years) groups that required high levels of skill in feeding assistance and nutrition: those with swallowing difficulties following a stroke and patients with dementia. Feeding assistance was a valued activity, but the consequences of poor feeding activity were marked. (U)

Illustration 1: [I]f I'm the nurse working with [a stroke] patient then I might use mealtime as a way of building their confidence around their ability to be independent...However 're-enablement'...takes high level of skill and it takes time. It is much easier and much quicker to do things for people, so to feed someone, rather than to sit beside them and help them to eat and drink to maximise their potential. The former is quicker and requires less skill unless someone's got a swallowing...problem in which case it is highly skilled work.(Stakeholder 2, nursing) p.635<sup>35</sup>

Illustration 2: Can you imagine being so disabled that you can't speak and say to someone I've had enough? You have to physically watch every expression on their face...[it's also a matter of] dignity, their respect. (Stakeholder 6) p.635<sup>35</sup>

Illustration 3: [A]s caring as family are they may not always have the insight into safely feeding patients [who've suffered a stroke]...it's also knowing what the ethical boundaries of feeding are because I think often relatives don't understand that...you can offer feeding and offer it in a safe way, but you can't go beyond that in getting patients to eat and drink...so I suppose there are quite a lot of

issues on that front that are important in getting family engagement and understanding that nutrition is a complex issue. (Consultant 2, stroke, region 2) p.636<sup>35</sup>

Illustration 1 [M]ost of the reasons why they won't eat is usually to do with their cognitive impairment ...which either means they don't want to eat or they are not aware of the sensation of it... sometimes with dementia people can develop psychosis where they have paranoid beliefs. They might believe that we are trying to poison them or there is something wrong with the food...[They might also have] dyspraxia [so] that they are not able to manage the cutlery properly, the dementia itself might cause problems with chewing and swallowing as well. (Clinical Team Leader, dementia, region 1) p.636<sup>35</sup>

Illustration 2: Quite often patients...with dementia they can be very distractible so that sitting them down at mealtime can be awkward...Plus that population tends to be physically frailer so malnutrition is going to be more of an issue...So delivering, you know, a nutritionally appropriate diet...can be an extreme challenge...poor nutrition can prolong hospital stay...increase risk of infection...those sort of things. People are aware of those things but don't necessarily know how to combat them, in a practical way...we perhaps need to big it up a little bit. (Dietitian 1, region 2) p.637<sup>35</sup>

**Finding 19:** Food work is often described as common sense by staff, but this leads it to being overlooked and undervalued in practice. (U)

Illustration 1: I mean it might just be that...someone might need help just cutting their food up into little bits...that makes a big difference...Yeah I mean when you think about it, it's fairly simple sort of common sense stuff but it does make a difference. And I think it has been overlooked quite a lot by, well everyone really I suppose. [Occupational therapist 1, region 1) p.637<sup>35</sup>

Illustration 2: [M]ealtimes were an incredibly important part of the day...all nursing staff had to be available to help patients with meals and Ward Sisters personally served the food from the trolley and then...it was queried why you needed...nurses to be involved in such a straightforward exercise that anybody could do...The public think that nurses don't care ...but actually the nursing profession have been required to disengage from...'low level work'...the analogy would be washing...registered nurses struggle[d] to articulate what they were doing whilst they were helping a patient wash. They weren't just putting soap and water on skin, they were doing so many other things however because they struggled to articulate what they were doing...[it] drew the attention of people who were striving to make the nursing workforce a more cost effective team. (Stakeholder 2) p.639<sup>35</sup>

#### **Paper 4: Manning et al. 2012<sup>40</sup>**

This mixed methods study was a health services evaluation, the aim of which was to evaluate the effectiveness of a voluntary feeding assistance program at improving patients' food intakes. Qualitative data was collected through observations and interviews, the qualitative data presented was however limited.

**Finding 20:** Nurses and volunteers considered that the voluntary feeding assistance program was effective and helpful for older patients (>65 years) I. (U)

Illustration 1: Volunteers "encouraging", "wonderful" "helpful". (Patient interviews) p.475<sup>40</sup>

Illustration 2: Much Appreciated! (Nurse) p.475<sup>40</sup>

Illustration 3: Volunteers assist with patients with uncomplicated behaviours and uncomplicated swallowing problems. (Nurse) p.475<sup>40</sup>

Illustration 4: When patient eats everything for you when they haven't been eating. (Volunteer) p.475<sup>40</sup>

#### **Paper 5: Robison et al. 2014<sup>25</sup>**

The objective of this study, the Southampton Mealtime Assistance Study, was to obtain multiple perspectives on nutritional care of older inpatients, acceptability of trained volunteers and identify important elements of their assistance. Semi-structured interviews and focus groups were conducted with nurses, patients or close relatives and volunteers before and after introduction of volunteer

mealtime assistants on one ward in a UK hospital, with a control ward receiving usual nutritional care. The study included female patients over 70 years and over.

Findings 21 -24 relate to the pre-intervention year.

**Finding 21:** Without support older patients (>65 years) developed their own strategies at mealtimes. (U)

Illustration 1: I try and order something I can eat with a spoon and a fork. I can't cut it, because I have had cellulitis. (Patient ID03 ward 1) p.141<sup>25</sup>

**Finding 22:** Older patients (>65 years) and relatives observed in their observations of staff that there were limitations and challenges to providing assistance at mealtimes and relatives wished more help was available. (U)

Illustration 1: Nurses help them with it, sometimes, but it depends how many are on.... They could do with more nurses to help.... They do their best....but some patients just won't eat any more. (Patient ID12 ward 1) p.141<sup>25</sup>

Illustration 2: They're very busy these nurses, and while they're trying to feed a patient, somebody else wants to go to the toilet or another nurse says: I need two people to move somebody. . . They just haven't got enough staff. (Relative ID28, ward 2) p.141<sup>25</sup>

Illustration 3: I think there is room for a carer type person to help the nurses...[Relative:ID30, ward 2] p.141<sup>25</sup>

**Finding 23:** Nurses highlighted a number of challenges and felt powerless to respond adequately at mealtimes and were unsure how to prioritize when so many older patients (>65 years) needed help. (U)

Illustration 1: It's really hard to weigh up who needs to be done first, because they all need to be done at the same time really. (Health care assistant IDSB3) p.141<sup>25</sup>

Illustration 2: There are so many pulls and demands on your time. You know it's important that everybody gets fed but you also know it's important they get their observations done, that they're turned, that their dressings are done, that their relatives are spoken to. . . They're all important, but they're not as important as someone who suddenly becomes acutely unwell, because you can't feed a dead patient. (Sister IDSB6) p.141<sup>25</sup>

Illustration 3: It's not difficult to monitor people for their intake. It's not difficult to weigh everybody once a week. It's not difficult to tell the dietician who's losing weight, but it's difficult to try and feed everybody three meals a day, when there's not enough people to help' (Staff nurse IDSB4) p.141<sup>25</sup>

**Finding 24:** Empowering ward leaders was considered important. (Un)

Illustration 1: Ward sisters identified the difficulty of dovetailing meal service by the host/ess and nursing assistance with feeding; wanted guaranteed times for meal service and expressed frustration about lack of continuity of ward host/esses. Matrons aspired to improve the training and communication skills of host/esses; develop the ward housekeeper role to coordinate the meal service with staff availability to help; and trial the red tray system. They emphasised the importance of empowering ward leaders to ensure a 'standardised consistent approach'; proposed changing times of nurses' meal breaks to maximise staff present at mealtimes and recognised the potential contribution of volunteers. p.141<sup>25</sup>

Findings 25 to 28 relate to the post-intervention period. Trained volunteers provided extra pairs of hands to support patients needing straightforward help, enabling nurses to feed patients with swallowing difficulties and be available for other care

**Finding 25:** Staff described positive aspects of having trained volunteers who provided extra pairs of hands to support older patients (>65 years) enabling nurses to be available for other care. (U)

Illustration 1: I think it just runs more smoothly. Because we've got support from the mealtime assistants we can do so much more. The patients are a lot happier because they are being fed. (Health care assistant IDSB16) p.142<sup>25</sup>

**Finding 26:** Volunteers saw that the time they offered made a difference to older patients (>65 years) and nurses (U)

Illustration 1: I've spent three quarters of an hour trying to persuade someone to eat half a meal. (Volunteer ID04, Focus group 1) p.142<sup>25</sup>

Illustration 2: That's what we're there for isn't it, to take the pressure off the nurses. (Volunteer ID06, Focus group 1) p.142<sup>25</sup>

**Finding 27:** Staff and patients appreciated that volunteers prepared all older patients (>65 years) for meals. (U)

Illustration: There are some volunteers who come round and actually sit and spoon feed people who need it. But one lady in particular she comes around to make sure you've got cloths to wipe your hands with and your table napkins and so on. I was very impressed with that. (Patient ID 47) p.142<sup>25</sup>

**Finding 28:** Volunteers had no doubt that preparing all older patients (>65 years) for mealtimes was worthwhile (U)

Illustration 1: That's why I think the patients like it. If they're asleep you wake them up, they can clean their hands, you can wipe those tables..... You might not be feeding that person, but their trolley is in the right place, ready for them so when the meal comes, it's not out of reach. (Volunteer ID01 Focus group 1) p.142<sup>25</sup>

Illustration 2: Instead of wasting their energy on struggling with a lid and trying to get the cutlery out of the plastic thingy their energy can go on actually eating. (Volunteer ID02, Focus group 2) p.142<sup>25</sup>

**Finding 29:** Nurses observed that social interaction was important (Un)

Illustration: Nurses observed that volunteers could encourage and motivate patients who seemed to have lost interest in food and provide social interaction thereby gleaning valuable information about a patient's mood which could be shared with staff. p.142<sup>25</sup>

**Finding 30:** Older patients (>65 years) saw volunteers as a regular presence with potential to build relationships (Un)

Illustration: Patients perceived the volunteers as a fresh face on the ward but also a regular presence with potential to build relationships. p.142<sup>25</sup>

**Finding 31:** Volunteers thought that older patients (>65 years) respected them and might eat their meals but recognised that some older patients (>65 years) will not eat despite encouragement. (U)

Illustration: Volunteers thought that patients respected them for helping without being paid and might 'make an effort' to eat in return. They recognised, however, that refusing food may signify a deteriorating condition and that some patients will not eat despite encouragement. p.142<sup>25</sup>

**Finding 32:** Nurses and volunteers recognised the benefit of having accurate information about older patients' (>65 years)' dietary intakes. (Un)

Illustration: Nurses welcomed volunteers' careful attention to completing food charts; an indication that both recognised the benefit of having accurate information about patients' dietary intakes to pass on to relatives and inform decisions about care. p.142<sup>25</sup>

**Finding 33:** Relatives were uncertain if their mother had been helped by a volunteer but welcomed the possibility, emphasising the benefits of encouragement and social interaction identified by staff: (C)

Illustration 10: I know that people in hospital generally don't get much help but I feel that elderly people could do with the encouragement. That thing about volunteers going in and being able to spend the time and encourage, that would be beneficial certainly. (Relative ID75) p.142<sup>25</sup>

**Finding 34:** Nurses respected the volunteers and good relationships and a sense of teamwork developed. (U)

Illustration 1: I think they needed to find their feet and staff needed to know what was expected of the volunteers. . . You get to know their names and faces, and they are like members of the team. (Sister IDSB14) p.142<sup>25</sup>

**Finding 35:** Nurses praised the volunteers attitudes and saw them as committed and reliable. (Un)

Illustration: They respected the volunteers' good attitude combining confidence, willingness to ask for help without being demanding, commitment and reliability. p.142<sup>25</sup>

**Finding 36:** Nurses appreciate that the research team had trained the volunteers and took responsibility for them on the ward (U)

Illustration: I've seen they're not just left to their own devices. People spend time showing them what they have to do. They're not just chucked in at the deep-end and it isn't left to us. It's not an extra role for us to have to show them around the ward. (Sister IDSB14) p.143<sup>25</sup>

**Finding 37:** Staff were hopeful that the volunteers would continue. (U)

Illustration: I think it will be a massive blow if we don't keep it going, because you get into that routine where you're used to having them.... It's just so much easier. When it comes to weekends you think, oh it's the weekend, they're not coming (Health Care Assistant IDSB16) p.144<sup>25</sup>

**Finding 38:** Staff described an increased awareness of the importance of nutrition and mealtime care as a result of volunteers providing assistance at mealtimes. (Un)

Illustration: Staff accounts indicate that the impact of department-wide developments in nutritional care was felt on both wards. They described increased awareness of the importance of nutrition and mealtime care, reflected in the mealtime coordinator role and greater stability and regularity in meal. p.144<sup>25</sup>

**Finding 39:** Staff highlighted a synergy between other initiatives and the introduction of volunteers at mealtimes. (U)

Illustration 1: The way it's come in, it's worked. Because you've had the mealtime assistants come in, then they've introduced the red trays, more than what they did, and now we have a mealtime coordinator, which is normally our housekeeper for breakfast and lunch, and then one of us for supper. And it means we go around making sure everyone gets the right meal, a drink, and is sat upright It's just all fitted and works really well now. When they brought in the protected mealtime as well, that made everyone's lives even easier, because it meant that the mealtime assistants can get on and do their feeds. (Health care assistant IDSB16). p.144<sup>25</sup>

## **Paper 6: Roberts et al. 2014<sup>41</sup>**

This paper reported on the same study as paper 5, the Southampton Mealtime Assistance Study. This paper focused on the feasibility and acceptability of providing volunteer mealtime assistance.

**Finding 40:** The volunteers were very positive about their contribution. (U)

Illustration: And these are the people that presumably this research is, is trying to catch.... and sort of get them back on, on their feet again and then follow them up when they're home.... and we could be the difference. (Volunteer 04) p.3244<sup>41</sup>

**Finding 41:** Volunteers were confirmed to be competent in each task. (U)

Illustration: And the first time on the ward we were supervised by somebody. You know we weren't just then said oh well you've done your training and off you go. Somebody was actually there..... watching what we were doing the first time we did it, so I felt we got well supported at that point. (Volunteer 02) p.3245<sup>41</sup>

**Finding 42:** Volunteers felt that their role could be initially challenging but grew more fulfilling with time. (U)

Illustration: I'm enjoying it; every minute of it. I think it's got better from the beginning... I think we're more natural about it. We all know what we're doing now. (Volunteer 05) p.3245<sup>41</sup>

**Finding 43:** Volunteers did find it difficult and upsetting at times but appreciated the training and ongoing support provided by the research team (Un)

Illustration: The volunteers did find it difficult at times if there were several patients to feed at the same time or if the nurse was delayed in helping a patient with swallowing difficulties and the other patients were eating. They also found it upsetting when patients deteriorated, but appreciated that this aspect had been discussed in the training session and ongoing support was offered by the research team: these aspects became easier to manage with experience. p.3245<sup>41</sup>

**Finding 44:** Nursing staff recognised the opportunity the trained volunteers gave them to perform other tasks. (U)

Illustration: I think it just runs more smoothly. Because we've got support from the mealtime assistants we can do a lot more, so much more. (Nurse 16) p.3244<sup>41</sup>

**Finding 45:** Older patients (>65 years) and ward staff valued the volunteers' contributions. (U)

Illustration 1: I tell you what's very good here too – at lunchtime they have unpaid helpers who come and go around and they'll sit and feed, you know, which is very good. And it's somebody fresh on the ward. (Patient 44) p.3244<sup>41</sup>

Illustration 2: Now they've set up this mealtime assistance. And they come and ask you if you need any help. The same with the plastic pots, they open... the lids for you, because they're a nightmare some of them. (Patient 55) p.3244/5<sup>41</sup>

Illustration 3: I've seen the same lady twice, so I assume they're on a week by week thing, you know that they do one day a week here or something, but if you were in a long time you could have quite a good relationship with them. (Patient 47) p.3245<sup>41</sup>

Illustration 4: The caterer said it's so wonderful to be able to come in and put a tray down, because normally they have to move everything, and it's difficult. So at least they appreciate it. (Volunteer 03) p.3245<sup>41</sup>

**Finding 46:** Volunteers had a sense of achievement and valued the support they received when they were able to share their experience of mealtime assistance at coffee mornings and focus groups (U)

Illustration: I think I really got a lot out of hearing other peoples' experiences and picking up what other peoples' good ideas are for instance..... you don't see the people who aren't on, on your day, so I think it's very valuable that everyone can have opportunity to meet up. (Volunteer 02) p. 3256<sup>41</sup>



This study explored staff perceptions and explanations for poor nutritional intake in older medical patients through three focus groups involving 22 healthcare staff working on the acute medical wards of a larger tertiary teaching hospital.

**Finding 47:** A potential barrier to nutritional care of older patients (>65 years) was poor knowledge of nutrition care processes, despite a shared awareness of the prevalence of malnutrition non-dietetic staff agreed they had limited nutritional knowledge and suggested a range of informal techniques for identifying patients' nutritional status. (U)

Illustration 1: I don't know of any set thing when (patients) come into hospital (I think) you just see it from basic appearance. (Nurse) p.43<sup>37</sup>

Illustration 2: If (patients) look underweight then I guess there is an interview process where they track what it is that they are actually eating at home. (Speech pathologist) p.43<sup>37</sup>

Illustration 3: That's quite a common complaint in elderly patients, they say they are having trouble with their teeth, but see I wouldn't know where to go with that. (Occupational therapist) p.43<sup>37</sup>

**Finding 48:** A potential barrier to nutritional care of older patients (>65 years) was poor communication between disciplines. (U)

Illustration 1: It is quite rare that we actually get informed of patients having difficulty (with) physically eating. (Occupational therapist) p.43<sup>37</sup>

Illustration 2: I modify a patient's diet (and) four days later find that they have been on the wrong diet (and) they are terribly upset because they haven't been able to eat. (Speech pathologist) p.43<sup>37</sup>

**Finding 49:** A potential barrier to nutritional care of older patients (>65 years) was lack of role clarity and shared responsibility. (U)

Illustration 1: 'Then I have heard about the people, I think its assistants, who do food audits. I don't know if that's on (everyone). Not sure. (Speech pathologist) p.43<sup>37</sup>

Illustration 2: 'I know (malnourished patients) get a sticker in the chart, but from that point onwards (I) am not so sure. (Physiotherapist) p.43<sup>37</sup>

Illustration 3: In the back of my head I think that the nurses that are caring for them would be sort of keeping an eye on them. (Speech pathologist) p.43<sup>37</sup>

Illustration 4: I know that some of the patient's families come in at mealtimes (and) you know you don't have to worry (that they are going to get fed). (Nurse) p.43<sup>37</sup>

Illustration 5: The patient may have had their meal there for about 15 minutes or so (and) actually the meal is still sitting to the side (and) no one has moved it. (Dietitian) p.43<sup>37</sup>

**Finding 50:** A potential barrier to nutritional care of older patients (>65 years) was competing priorities at mealtimes. (U)

Illustration 1: You have to take (patients) places (and) you have to have your lunch break as well (and) just not enough "hands" usually to go around. (Nurse) p.43<sup>37</sup>

Illustration 2: There is also a drug round at lunch time and nurses can't be stuck cutting up food (when) trying to do drugs. (Pharmacist) p.43<sup>37</sup>

Illustration 3: I think sometimes (patients) can be so acute that nutritional status kind of gets put on the back burner until (medical staff) get everything else sorted out, and that can be a number of days. (Nurse) p.43<sup>37</sup>

Illustration 4: Sometimes the meal might have to suffer (when) we actually need the skilled people (to) tend to the situation that requires the skill. (Nurse) p.43<sup>37</sup>

Illustration 5: If I see a patient out (of) bed I'll stick the tray in front of them (but) I can't hang around there because I have to (treat) the next patient. (Physiotherapist) p.43<sup>37</sup>

**Finding 51:** A potential barrier to nutritional care of older patients (>65 years) was that nurses felt a sense of powerlessness to prioritise nutrition in the hospital setting. (U)

Illustration 1: We notice that breakfast always comes when you want to do “meds” and “obs”. (Nurse) p.44<sup>37</sup>

Illustration 2: I think that happens a lot at mealtimes (the meals) seem to come right when we are busy. And you just wonder if they came like half an hour later what a difference that would make. (Nurse) p.44<sup>37</sup>

Illustration 3: Depends on the patient compliance and whether they want to be eating, whether they are willing to co-operate with encouragement. (Nurse) p.44<sup>37</sup>

Illustration 4: And their medical conditions, whether they are having swallowing difficulties (and) they are non-compliant, pulling out tubes. (Nurse) p.44<sup>37</sup>

Illustration 5: We have got bread and we can make them toast, that is about it. (Nurse) p.44<sup>37</sup>

Illustration 6: We can provide the meals and mid meals and have (staff) here to encourage them (and) we actually see some people really build up. (Dietitian) p.44<sup>37</sup>

Illustration 7: I think also that a lot of (patients) come from home malnourished and it doesn't get any better when they come in here. (Nurse) p.44<sup>37</sup>

**Finding 52:** Staff suggestions for improving nutrition care older patients (>65 years) included allow family members to be “extra hands” on the wards at mealtimes so staff would have more time for other tasks. (U)

Illustration: (Patients) need to be a bit more proactive sometimes and let their family members care. That would help them feel more empowered and we could have more time to do other stuff. (Nurse) p.45<sup>37</sup>

**Finding 53:** Staff suggestions for improving nutrition older patients (>65 years) care included employing more staff on the wards at mealtimes. (U)

Illustration: (If) someone was responsible for, you know, helping with meals they would pick up a lot of (barriers) and (they) would be a bit easier to address. (Physiotherapist) p.45<sup>37</sup>

#### **Paper 8: Naithani et al. 2008<sup>36</sup>**

The purpose of this study was to examine in-patients' experience of access to food in hospitals, qualitative semi-structured interviews with 48 patients from eight acute wards in two London Hospitals were included. Data was extracted relating to help and assistance.

**Finding 54:** Assisting and monitoring older patients (>65 years) at mealtimes seen as a low priority activity. (U)

Illustration 2: When I've needed my food cutting or if I've dropped something . . . sometimes they've forgotten and I have to ask them again. Once I waited for over 10 minutes before someone came and helped me. It's difficult sometimes to get their attention because they don't always come into the room... I can see they are still around but they seem to be doing paper work or something. (Stroke ward –female, 81 years) p.299<sup>36</sup>

**Finding 55:** Older patients (>65 years) who experienced physical difficulties felt powerless to complain when staff interrupted mealtimes. (U)

Illustration 2: The doctor came round, I think she was running late, she said she would only be a little while and I could have me lunch brought in but she said for ages. By the time she left my food had gone cold, so I didn't eat it. (General medical – male 76 years) p.300<sup>36</sup>

#### **Paper 9: Walton et al 2006<sup>38</sup>**

This study aimed to elicit concerns of key stakeholders regarding food service provision to long stay hospital patients in public and private hospitals in New South Wales, Australia. Ninety eight

participants were included and focus groups and interviews were conducted. Data was extracted relating to feeding assistance.

**Finding 56:** Older patients (>65 years) need assistance and preparation to eat and registered nurses are busy at mealtimes and feeding support is often more appropriately delegated to other staff. (U)

Illustration 1: The bottom line is that it is an assistant nursing function rather than a nursing function. That's how they do it in nursing homes. Because the trained nurse is basically glued to the drug trolley. (Dietitian) p.16<sup>38</sup>

Illustration 2: I think it's a fairly universal problem. When working as a nutrition assistant I didn't feel that my morning was complete until I had gone around and buttered several toasts and you know open sugar and made cups of tea for patients and you just follow the meal trolley around and assist the nursing staff in that regard. (Nutrition Assistant). p.16<sup>38</sup>

Illustration 3: Making foods easier for people to eat is a major thing, whether it's from actually sitting a person close enough for them to reach it, whether it's opened for them, with the patient sitting upright, if they need feeding assistance. (Dietitian) p.16<sup>38</sup>

**Finding 57:** Some stakeholders talked of the possibility of older patients (>65 years) eating in dining rooms and the value of greater socialisation and a more usual eating environment. (U)

Illustration: It's a very social event. A lot of people actually seem to eat quite well when they're sitting there talking and picking, rather than sitting in a hospital environment. It's not like sitting in a bed'. (Dietitian) p.17<sup>38</sup>

### Categories based on extracted findings

Findings identified during the extraction of data, were examined for similarity in meaning, leading to the development of categories. These categories were then aggregated into synthesised findings which could be used as a basis for recommendations for practice.

**Category 1:** Qualified staff were often unavailable to help older patients (>65 years) at mealtimes due to competing priorities.

Description: Qualified staff would use mealtimes to complete other tasks. Mealtime assistance was seen as low priority and older patients (>65 years) often developed their own strategies.

Included Findings: 7, 8, 9, 16, 17, 21, 50, 51, 54, 56

- Qualified staff were often involved in other tasks during the mealtime and, therefore, unavailable to provide care to older patients (>65 years). (U)
- Older patients (>65 years) were aware of the limited number of staff available to provide help at mealtimes. (U)
- Relatives commented on the lack of attention to older patients' (>65 years) needs with food being out of reach. (U)
- Feeding assistance was often a key topic in the accounts of older patients (>65 years) and carers when discussing the problem of malnutrition in hospital. (U)
- Hospital staff identified a range of barriers to effective feeding older patients (>65 years), including limited time and staff numbers, competing priorities or conflicting policies and issues regarding needs of particular patient groups. (U)
- Without support older patients (>65 years) developed their own strategies at mealtimes. (U)
- A potential barrier to nutritional care of older patients (>65 years) was competing priorities at mealtimes. (U)
- A potential barrier to nutritional care of older patients (>65 years) was that nurses felt a sense of powerlessness to prioritise nutrition in the hospital setting. (U)

- Assisting and monitoring older patients (>65 years) at mealtimes seen as a low priority activity. (U)
- Older patients (>65 years) need assistance and preparation to eat and registered nurses are busy at mealtimes and feeding support is often more appropriately delegated to other staff. (U)

**Category 2:** Interruptions related to ward activities had a negative impact at mealtimes older patients (>65 years)

Description: When ward activities continued during mealtimes the meal would be spoilt or left.

Included Findings: 6, 55

- Ward routines had a negative impact on mealtimes older patients (>65 years). (U)
- Older patients (>65 years) who experienced physical difficulties felt powerless to complain when staff interrupted mealtimes. (U)

**Category 3:** Assistance provided by staff for older patients (>65 years) at mealtimes was seen as positive.

Description: Staff prioritising mealtimes for older patients (>65 years) and feeding assistance has a positive effect.

Included Findings: 2, 10, 11, 12, 14, 15, 18, 19, 24, 53

- Assistance at meals was provided by staff for older patients (>65 years) especially with regard to opening packages. (U)
- Mealtimes were considered enjoyable following staff reflection and action learning on the process. (U)
- Changes made to nursing practice meant that qualified nurses were available to assist older patients (>65 years) in mealtime care, this had a positive effect on both patients' and staff mealtime experience. (U)
- Getting to know the older patients (>65 years) and taking the time to provide what was needed for individual patients' assessment emerged as a new aspect to assessment. (U)
- Staff able to prioritize nutritional care and be actively involved in mealtimes. They were then in a position to observe and monitor what older patients (>65 years) were eating and any difficulties they were experiencing. (U)
- Food work in hospital requires staff to follow procedures and all staff engaging in serving meals should be able to complete these routines but also involve taking the initiative and understanding the older patients' (>65 years) perspective and to empathically assist when necessary. (U)
- Ward-based staff identified two older patients (>65 years) groups that required high levels of skill in feeding assistance and nutrition: those with swallowing difficulties following a stroke and patients with dementia. Feeding assistance was a valued activity, but the consequences of poor feeding activity were marked. (U)
- Food work is often described as common sense by staff, but this leads it to being overlooked and undervalued in practice. (U)
- Empowering ward leaders was considered important. (Un)
- Staff suggestions for improving nutrition care of older patients (>65 years) included employing more staff on the wards at mealtimes. (U)

**Category 4:** Relatives support for older patients (>65 years) at mealtimes is positive and valued.

Description: Encouraging relatives to help with providing assistance for older patients (>65 years) could be beneficial as this allows staff to have more time for other tasks. Also learning strategies from the family and communicating this to the ward staff is important.

Included findings: 3, 13, 52

- Additional assistance older patients (>65 years) was provided by relatives and seen as a positive interruption. (U)
- Working with older patients' (>65 years) families, learning strategies from them and communicating these to the rest of the team was important. (U)
- Staff suggestions for improving nutrition care of older patients (>65 years) included allow family members to be "extra hands" on the wards at mealtimes so staff would have more time for other tasks. (U)

**Category 5:** Social interaction for older patients (>65 years) can be positive

Description: Older patients (>65 years) and relatives valued the social interaction with other patients and volunteers at mealtimes. Staff thought that encouraging older patients (>65 years) to socialise with other patients through the use of a dining room would encourage patients to eat more and create a more usual eating environment

Included findings: 1, 4, 5, 29, 30, 33, 57

- Bedside was the most common eating location but dining rooms were utilised for mobile older patients (>65 years) at lunch and tea time. (U)
- Social interaction with other patients at mealtimes can be positive. (U)
- Allied health rounds create interaction with older patients (>65 years) and can be positive. (U)
- Nurses observed that social interaction was important. (Un)
- Older patients (>65 years) saw volunteers as a regular presence with potential to build relationships. (Un)
- Relatives were uncertain if their mother had been helped by a volunteer but welcomed the possibility, emphasising the benefits of encouragement and social interaction identified by staff: (C)
- Some stakeholders talked of the possibility of older patients (>65 years) eating in dining rooms and the value of greater socialisation and a more usual eating environment. (U)

**Category 6:** Volunteer programmes for older patients (>65 years) are seen as positive and worthwhile.

Description: Volunteer programmes to provide mealtime support for older patients (>65 years) are seen as positive by patients and staff. Volunteers feel like they make a difference and that what they do is worthwhile. Nurses appreciate the extra help at mealtimes for older patients (>65 years) which frees them up to attend to other tasks or feeding the more difficult patients.

Included Findings: 20, 25, 26, 27, 28, 32, 34, 35, 36, 37, 38, 39, 40, 41, 44, 45

- Nurses and volunteers considered that the voluntary feeding assistance program was effective and helpful older patients (>65 years). (U)
- Staff described positive aspects of having trained volunteers who provided extra pairs of hands to support older patients (>65 years) enabling nurses to be available for other care. (U)
- Volunteers saw that the time they offered made a difference to older patients (>65 years) and nurses. (U)
- Staff and older patients (>65 years) appreciated that volunteers prepared all older patients (>65 years) for meals. (U)
- Volunteers had no doubt that preparing all older patients (>65 years) for mealtimes was worthwhile. (U)
- Nurses and volunteers recognised the benefit of having accurate information about older patients' (>65 years) dietary intakes. (Un)
- Nurses respected the volunteers and good relationships and a sense of teamwork developed. (U)
- Nurses praised the volunteers' attitudes and saw them as committed and reliable. (Un)
- Nurses appreciate that the research team had trained the volunteers and took responsibility for them on the ward. (U)
- Staff were hopeful that the volunteers would continue. (U)

- Staff described an increased awareness of the importance of nutrition and mealtime care as a result of volunteers providing assistance at mealtimes. (Un)
- Staff highlighted a synergy between other initiatives and the introduction of volunteers at mealtimes. (U)
- The volunteers were very positive about their contribution. (U)
- Volunteers were confirmed to be competent in each task. (U)
- Nursing staff recognised the opportunity the trained volunteers gave them to perform other tasks. (U)
- Patients and ward staff valued the volunteers' contributions. (U)

**Category 7:** Volunteers found their work with older patients (>65 years) could be challenging

Description: Volunteers felt that initially the work with older patients (>65 years) could be challenging especially if older patients (>65 years) still didn't want to eat. It was often difficult and upsetting but they valued their training and ongoing support from other volunteers

Included findings: 31, 42, 43, 46

- Volunteers thought that older patients (>65 years) respected them and might eat their meals but recognised that some patients will not eat despite encouragement. (U)
- Volunteers felt that their role could be initially challenging but grew more fulfilling with time. (U)
- Volunteers did find it difficult and upsetting at times but appreciated the training and ongoing support provided by the research team. (Un)
- Volunteers had a sense of achievement and valued the support they received when they were able to share their experience of mealtime assistance at coffee mornings and focus groups. . (U)

**Category 8:** Staff, patients and relatives recognised that providing assistance older patients (>65 years) can be challenging.

Description: Staff, patients and relatives recognised that providing assistance for older patients (>65 years) at mealtimes could be challenging. These challenges can leave nurses feeling powerless to prioritise nutrition in the hospital setting.

Findings included: 22, 23

- Older patients (>65 years) and relatives observed in their observations of staff that there were limitations and challenges to providing assistance at mealtimes and relatives wished more help was available. (U)
- Nurses highlighted a number of challenges and felt powerless to respond adequately at mealtimes and were unsure how to prioritize when so many patients needed help. (U)

**Category 9:** Lack of clarity around responsibility for feeding support for older patients (>65 years).

Description: Communication and knowledge of nutrition care processes between disciplines was poor and staff felt that these factors acted a potential barriers to nutritional care of older patients (>65 years).

Included Findings: 47, 48, 49.

- A potential barrier to nutritional care of older patients (>65 years) was poor knowledge of nutrition care processes, despite a shared awareness of the prevalence of malnutrition non-dietetic staff agreed they had limited nutritional knowledge and suggested a range of informal techniques for identifying patients' nutritional status. (U)
- A potential barrier to nutritional care of older patients (>65 years) was poor communication between disciplines. (U)
- A potential barrier to nutritional care of older patients (>65 years) was lack of role clarity and shared responsibility. (U)



### Appendix XIII: Extracted and coded quantitative findings

#### Walton et al. 2008<sup>20</sup> Australia

Experiences of volunteers (n=10), nurses (n=13) in relation to a volunteer feeding assistance explored as part of intervention study

##### Type of feeding assistance

The volunteers were observed doing numerous tasks at the mealtimes including opening food and beverage packets, removing lids, making drinks, opening supplements, moving the meal tray closer, rearranging the meal tray, feeding patients encouraging /prompting intake, providing social support and conversation at the meal, as well as providing written feedback for the nurses. From the survey data, opening packages was identified as an important role to assist and encourage dietary intakes.

##### Barriers to providing feeding assistance – lack of time , staffing resources

From the survey data 54% of nurses expressed concern about a lack of time or staffing resources at mealtimes.

##### Facilitators to eating -Time to assist patients

Volunteers (76%) felt that there was enough time to assist and feed patients.

##### Facilitators to eating - Social interaction

12/14 of the volunteers felt that company at mealtimes positively influenced the patient food intakes

#### Buys et al. 2013<sup>14</sup> USA

Description of services provided by volunteers that may promote nutritional intake as part of a volunteers feeding assistance program (SPOONS).

##### Time to assist patients

Mean time of interaction of volunteers with each patient was 47.8 minutes.

##### Type of feeding assistance

Tasks completed by the volunteer and time spent with each patient from 235 patient-volunteer encounters were recorded. Most frequently performed volunteer tasks were social interaction (n=217, 93%), assistance with trays set up (n=162, 69%), prompting to eat (n=161, 68%), assistance with feeding (n=106, 45%), passing out trays (n=73, 31%).

#### Huxtable & Palmer 2013<sup>32</sup> Australia

To compare mealtime interruptions and mealtime assistance received before and after the implementation of a Protected Mealtimes Programme

1632 observations (Intervention n=833 / Control n=799) on 1012 hospitalised patients.

##### Interruptions

Number of interruptions significantly increased after the introduction of protected mealtimes (intervention n=228, 27%, control n=142, 18%), p=0.000

Although feeding assistance increased and the number of nursing staff on the ward also increased as their lunchtimes had been moved which inadvertently increased interruptions.

##### Assistance by staff at lunchtimes

After the implementation of protected mealtimes significantly more patients received help with feeding during mealtimes (intervention n=66, 29%, control 31 (15%), p<.0.05. There were no significant differences in the number of patients needed assistance with set up, help with cutlery or meal cut up or being encouraged to eat.

The proportion of inpatients receiving feeding assistance when required nearly double post intervention, p=0.002.

##### Facilitators to eating - meals within reach

More meals were within reach of the patient after the implementation of protected mealtimes (intervention n=741, 94%, control n=700, 89%) p=0.000

Patients were more likely to consume at least half of the nutrient dense foods and drinks available if their meal was within reach, p=0.003.



**Facilitators of feeding assistance -time to assist patients**

The median time until first assistance was received in those that required it at dinner improved by approx. 4 min after the implementation of protected mealtimes intervention,  $p=0.008$ .

**Facilitators to eating Time to eat meal**

The number of minutes provided to eat the meal between delivery and collection improved after the implementation of protected mealtimes (intervention median 57 (17-146), control median 53 (26-95)  $p=0.000$ ).

**Young et al. 2011<sup>34</sup> Australia –**

To implement and compare three interventions designed to specifically address mealtime barriers in older medical patients. The uptake of mealtime assistance and interruptions before ( $n=115$  patients) and after the introduction of protected mealtimes ( $n=39$  patients), an assistant in nursing ( $n=58$  patients) or protected mealtimes and an assistance in nursing ( $n=42$  patients).

**Barriers of feeding assistance - Interruptions**

No reduction in the occurrence of mealtime interruptions was observed, despite introduction of Protected Mealtimes (PM), Assistant in Nursing (AIN), or PM & AIN (pre intervention group: 38% of patients interrupted, AIN: 22%, PM: 33% PM & AIN: 26%;  $p=0.18$ ).

**Barriers of feeding assistance - nursing tasks during mealtimes**

There was a significant reduction in non-clinical nursing tasks at mealtimes in all interventions (Pre: 66% of meals where nurses were completing non-clinical tasks, AIN: 31%, PM: 27% PM & AIN: 36%;  $p<0.01$ ).

**Facilitators of feeding assistance - Assistance by staff at lunchtimes**

There was a significant increase in mealtime assistance provided after the introduction of the interventions, with 30% of participants in the pre-intervention group receiving assistance at one or more meals on the study day, compared with 79% (AIN), 80% (PM) and 76% (PM & AIN),  $p<0.01$ ).

**Roberts et al. 2014<sup>41</sup> UK**

To determine the feasibility of delivering volunteer mealtime assistance over 1 year. By investigating the delivery and content of training programme and the mealtime activity of the volunteers along with any adverse events associated with feeding patients  
Volunteers ( $n=29$ )

**Type of feeding assistance**

Mealtime assistance included encouragement to eat, support with opening packets and setting up the meal tray, cutting up food, helping guide the food to the patient's mouth and actually feeding patients.

**Experience of volunteers**

Twenty-two (76%) of the trained volunteers delivered mealtime assistance one day each week, seven (24%) volunteered on two days. Over the year, the volunteers assisted on 229 weekday lunchtimes: feeding, encouraging and assisting, preparing tables and cleaning hands before lunch. 3911 (76%) patients on the ward received assistance over the year. There were no adverse events associated with feeding patients. Mean duration of mealtime assistance by volunteers was 5.5 months (range 1–11 months); seven (24%) volunteers assisted for at least 10 months.

**Training and support for volunteers**

The volunteers received ongoing support from the hospital voluntary services team over the year as is usual practice. In addition, a member of the research team attended the ward each lunchtime; help was mainly required if the patient coughed or needed further swallow assessment.

Eighteen volunteers (62%) required little input, were confident in their role and able to support less experienced mealtime assistants. Eight (28%) were less confident, needed supervision and guidance on occasion and help with completing paperwork, three (10%) needed guidance. The provision of ongoing support was determined by the needs of individual volunteers and was not related to duration of experience as a mealtime assistant.

**Walton et al. 2013<sup>42</sup> Australia**

To identify environmental factors that were associated with achieving adequate food consumption on rehabilitation wards in a hospital context. The questions covered access to food between meals,

barriers to food intake, time available for eating, assistance to eat, food quality, food brought by relatives and friends, and overall satisfaction with the food services provided

Questionnaires completed through patient (n=11) and staff (n=11) structured interviews

### **Barriers to providing feeding assistance – lack of time**

A small number of staff (11% ) stated that 'there was not enough time' to allow them to identify patients that need assistance

When asked to comment on whether nurses were available during mealtimes, 33% of patients responded 'yes', 33% 'usually' and 33% said 'no'

Assistance by nurses was available to many patients at meals but more was required.

When asked if there was enough time to assist patients in a timely manner, 25% felt that there 'wasn't adequate' time

### **Barriers to eating**

Potential barriers to adequate dietary intake identified by nurses included: patients being unwell, having a poor appetite, the high level of packaging of the food, the presentation of the meals and the eating environment (i.e. in a ward rather than a dining room).

Observations of mealtimes revealed that opening food and beverage packaging was the largest negative factor at each main meal (breakfast 40%, lunch 33%, tea 34%). Other factors included inappropriate tray and/or patient position meal (breakfast 22%, lunch 18.5%, tea 16%)

### **Barriers of feeding assistance - negative interruptions**

Medication rounds (Breakfast 34.5%, lunch 16.5%, tea 14.0%)

X-rays being scheduled at lunch time ((Breakfast 0%, lunch 6%, tea 0%)

Physiotherapist visiting (Breakfast 14.5%, lunch 4%, tea 0%)

OT visiting (Breakfast 2%, lunch 2%, tea 0%)

Doctor visiting (Breakfast 0%, lunch 8%, tea 0%)

### **Facilitators of feeding assistance - positive interruptions**

Dietitian (Breakfast 0%, lunch 10%, tea 0%)

Visitors (Breakfast 0%, lunch 6%, tea 38%)

Additional food provided by doctor (Breakfast 0%, lunch 4%, tea 0%)

Nutrition assistant (Breakfast 14.5%, lunch 2%, tea .0%)

### **Facilitators of feeding assistance - time to eat**

Most patients (70%) indicated that they were given enough time with their meals

Time to eat breakfast: mean 21.4+9.7 mins / median 20.0 mins (range 5-4 mins)

Time to eat lunch; mean 23.5+10.7 mins / median 21.0 mins (range 3-52 mins)

Time to eat tea mean 21.8=10, median 20.0 mins (range 3-55 mins)

Time from tray delivery to commencement of meal taken to start a meal (breakfast (4.5+7.9 mins), lunch (1.8+3.5), tea (1.8+3.5 mins).

There was a statistically significant difference between the times from tray delivery to commencement of meal taken to start breakfast and the time taken to start, p=0.040

### **Type of assistance**

Ninety-three occasions of mealtime assistance were noted (nurses 61, food service assistants 14, visitors 8, researchers 7 and other patients 3). Food service assistance was provided when the meal was delivered and during the meal including encouragement, assistance with opening packaging, feeding, socialisation and providing a favourite food. The bedside was the most common location for consuming meals. Two of the three sites had a dining room which was utilised frequently at lunch and tea. Improved intakes were observed when patients ate together in a dining room.

In one hospital each course was served 'restaurant style' to each patient who went to the dining room, these interactions were not recorded, as it was apparent that food service staff provided very specific assistance to all patients in the dining room. All lids were removed and all patients ate at dining tables of four to six patients.

From the patients perspective , 22% of the patients felt that they needed assistance with eating, 44% of the patients said they needed assistance to open food and beverage packaging

Several patients needed more than one type of assistance at meals (e.g. three nursing assists and one food service assist at a breakfast meal).

### **Facilitators to eating- Location**

40% of patients preferred to use a dining room when available

**Tsang 2008<sup>10</sup>** Australia

To observe patients (n=46) at mealtimes in order to determine the amount of assistance needed by each patient and the time taken to provide this assistance

**Types of assistance**

Levels of feeding assistance categorised

Total independence - Patient requires no assistance from nursing staff after receiving tray. 14 (30%) patients required no assistance from staff at mealtimes. They were predominately younger than 75 years of age and physically independent

Partial independence - Self-feeding is demonstrated but requires help with tasks. This includes patients who try to eat independently, patients who response to verbal instruction and patients who need physical guidance such as tray setup and positioning. 23 (50%) required partial assistance at meals and of those 20 (87%) actually received help that they needed, they had their needs basically fulfilled by ward staff. The most common type of assistance provided to these patients was physical guidance.

Total dependence - An inability to self-feed was demonstrated. Patient required intensive levels of physical assistance and/or verbal guidance to be able to eat. 9(20%) patients required full assistance for eating at mealtimes. 6 (76%) of these patients received assistance ranging from tray set-up to total feeding. They were predominately over 80 years of age, female, on multiple drugs with long hospital stay. Three of the nine patients did not receive any help from caregivers with eating.

**Staffing levels**

Breakfast was the busiest time in the day for staff as it had the lowest percentage of totally independent patients compared with lunch and dinner. Lunch time was the least busy meal. At lunch time, there were only 10% totally dependent patients and up to 35% of the patients were totally independent in eating. Although there was usually help from relatives, the evening mealtime was very difficult as there was a smaller number of nursing staff with a higher percentage of totally dependent patients (15%).

**Time for assistance**

Nurse assistants (ANs) were the main providers of eating assistance in the ward. They spent a total of 85 minutes per day on eating assistance. A total of 123-minute assistance time was provided by nursing staff: registered nurses (RNs), enrolled nurses (ENs) and trainee enrolled nurses (TENs)

Time needed for assisting totally dependent patients was nearly four times longer than for the partially dependent patients.

Partial dependence: Breakfast 3.7 mins, Lunch 4.5 mins,, Dinner 3.8 mins

Total dependence; Breakfast 15.7 mins, Lunch 16.7 mins, Dinner 10.8 mins

The average numbers of patients who were totally independent, partially dependent and totally dependent at mealtimes were 7, 12 and 3 per meal, respectively.

**Walton et al. 2012<sup>33</sup>** Australia

To explore current practices, perceived barriers and to identify priority opportunities to enhance nutrition support of food service provision in Australian hospitals

Cross sectional web based questionnaire with Dietitians (n=92), Food Service Managers (FSMs) (n=58), Nurse Unit Managers (n=68) from across 184/165 eligible hospitals with longer stay elderly patients

**Time for assistance**

Mean reported time available for each main meal was 40 minutes, 98.5% of nurses felt that they had adequate time to assist and feed patients who required it.

**Types of assistance**

42% of patients required mealtime assistance.

There was agreement that the setting up of patients to access their meals and assisting those unable to feed themselves is primarily the responsibility of nurses. Few dietitians (14.5%) or FSMs (21.5%) indicated that trained, non-nursing staff were available to assist with feeding at meals, only

one site mentioned a volunteer feeding assistance programme.

Fifty-five percent of dietitians and 59.5% of FSMs reported that some non-nursing feeding assistance was provided, most often by food service assistants and visitors.

**Facilitators for providing feeding assistance**

Main priorities for adequate hospital nutrition by combined stakeholders were:

- Additional feeding assistance by nurses
- Non nursing feeding assistant available at meal
- Additional assistance to set up for meals